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COMPUTERWORLD

Pay, adventure draw IS job seekers to Kuwait

BY MITCH BETTS
CW STAFF

The Kuwait gold rush is on. Adventurous programmers and frustrated information systems executives in the U.S. are clamoring to get what they hope will be high-paying IS jobs in Kuwait, which has embarked on a $50 billion effort to recover from the Persian Gulf war.

"I'd like to cash in on the money," said a Florida-based programmer/analyst, one of several IS professionals who placed anonymous calls to *Computerworld* last week seeking information about jobs in oil-rich Kuwait. He said he hopes to make $50,000 to $70,000 per year tax-free by landing a job in the devastated country.

A former vice president of IS at a Midwestern bank who was pushed out of his job by a merger said he wants to work in Kuwait because he is excited by the prospect of building information systems from scratch using the latest software and hardware. Besides "it would be a great way to spend the next 20 years before retirement," he said.

Several IS managers looking for work in Kuwait have called Shirley Bascom, a recruiter at Compusearch, a division of Management Recruiters International, Inc. in North Canton, Ohio. Some of the managers are unemployed because of corporate consolidations or mergers, while others have peaked at their present companies and are looking for new opportunities, she said.

The interest in Kuwait has been triggered by the current oversupply of IS managers in the U.S., Bascom said. "These are managers with grown children and the flexibility to move."

San Francisco-based Bechtel Corp., which will have a major role in rebuilding Kuwait's oil industry, has been so deluged by

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SAA hits open systems track

BY JOHANNA AMBROSIO
CW STAFF

SOMERS, N.Y. — IBM will endow its Systems Application Architecture with more open systems features later this year and will continue a push to elevate its Unix-based AIX operating system to SAA-like status.

In an announcement planned for the second half of this year, IBM will build on its former statements of direction regarding interoperability between the two environments. Instead of providing only basic SAA-to-AIX links, IBM will mix and match elements between the two. IBM will also detail how it plans to interconnect with non-IBM equipment, company executives said in recent interviews.

"WE ARE DRIVING all our products into an open systems view."

Mike Saranga
Assistant General Manager
IBM's Systems Structure and Management Group

Included in the announcement will be statements of direction about IBM's plans to incorporate open systems elements — including the Posix interface, a distributed transaction processing monitor and the Open Software Foundation's Distributed Computing Environment — into both the SAA and AIX product lines.

Listen up

The new strategy is getting good reviews from users. "The users of the world have said, 'Look, guys, we want open systems, and we want to choose our players,' " said Dan Turner, president of the Petrotechnical Open Software Corp. user group in Houston. "For 30 years, IBM has asked but hasn't really listened. Now, maybe they're going to listen.

"I'd like to see how they're going to do all this," Turner added. "Connecting SAA to AIX could be an architectural nightmare, but it's fundamental that they're going to have to do it."

"We are driving all our products into an open systems view," said M. "Mike" Saranga, assistant general manager at IBM's Systems Structure and Management Group here and the person who oversees the company's open systems strategy. "Some of them are moving at different rates, but our thrust is to get

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Give this programmer sun, surf and software

BY CAROL HILDEBRAND
CW STAFF

You know the type. The neighbor who comes back from paradise and says, "Yeah, it's a nice place to visit, but I wouldn't want to live there."

"Hogwash," you think. "Bet you'd jump at the chance."

Just ask Jack Geis.

Nancy Rossi

St. John: *Telecommuting in paradise*

Geis, 45, decided that his many years as a programmer in the San Diego area were enough. So he gave up the workaday IS life, sold everything he owned except his Jeep and headed for tropical St. John in the U.S. Virgin Islands.

"I got tired of the traffic and the routine and the accidents on the freeway," Geis said. "I basically came here to get away."

But before he left, he told his firm that if it got in a bind, he would help out. That paved the way to one of the sweetest telecommuting setups imaginable.

"I wasn't here but about two weeks when they called me to do some programming for them," he said. Geis set up a consulting shop under the moniker Island Programming and worked for his former employer, Machine Industries, Inc., on a part-time basis.

"Basically, I just get up when I want to and program when I

Continued on page 16

IBM seeks converts to peer-to-peer plan

BY ELISABETH HORWITT
CW STAFF

LONDON — IBM launched a major campaign last week to make its Systems Network Architecture-based peer-to-peer networking strategy more attractive to users — local-area network users in particular.

Leading the way is expansion of the company's Advanced Peer-to-Peer Networking, a platform that eliminates much of the dirty work involved in setting up and maintaining peer-to-peer networks.

APPN is being extended beyond its current Application System/400 niche to OS/2 Extended Edition, the IBM 3174 Establishment Controller and a variety of non-IBM systems.

IBM also secured endorsements from some major LAN players, including Apple Computer, Inc. and Novell, Inc., to add APPN nodes.

"We are optimizing SNA for LAN environments and making it open to other systems," said Rick McGee, IBM's manager of communications systems architectures. As part of that optimization, the APPN software for OS/2 includes a new version of the LU6.2 peer-to-peer protocol, which is said to be twice as fast as the previous version.

APPN is essential for effective peer-to-peer SNA networking because it has dynamic routing, directory and configuration capabilities.

Eliminating waste

At Chemical Waste Management, for example, APPN "eliminates a lot of the complexity" of tracking resources across some 20 AS/400s as well as that of configuring systems at remote hazardous waste sites, according to Michael Hansen, the Waste

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BILL WALKER
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The 5th Wave

"WE SORT OF HAVE OUR OWN WAY OF PREDICTING NETWORK PROBLEMS."

EXECUTIVE BRIEFING

■ **Kuwait changes from a battle zone to a career opportunity zone** in the minds of some information systems professionals. U.S. technology executives and programmers are seeking IS-related work in the massive postwar rebuilding effort. Bechtel, which is expected to reap a windfall of construction projects, had to install an automated response system to handle the volume of calls from job seekers. **Page 1.**

■ **Kraft General Foods solves a manufacturing integration problem** by getting two vendors to link their systems together. After working with Kraft for a year, HP and Allen-Bradley announce links between factory controllers and the HP 9000 via Ethernet. The link is based on Transmission Control Protocol/Internet Protocol, but Allen-Bradley says it is still committed to Manufacturing Automation Protocol/Open Systems Interconnect. **Page 12.**

■ **IBM appears to boost open systems,** revealing plans to elevate the status of AIX and incorporate other Unix versions into SAA and AIX. Users praise the move but warn that IBM could face "an architectural nightmare" in solving the technology challenges. **Page 1.**

■ **The IS job market** has followed the rest of the economy in putting on the brakes. Hiring is down and becoming more selective, and chances for short-term improvement are slim. **Page 47.**

■ **Apple wins a round** of its controversial 1988 "look and feel" suit against Microsoft and HP. A federal judge disallows several defendants' motions, which could have undermined Apple's contentions. **Page 4.**

■ **IBM Credit Corp. settles out of court** with Cambex but says it will maintain an aggressive stance regarding the third-party leasing and parts markets. Cambex will continue to face gun-shy customers, whom IBM warns can be sued if they know they are using illegally distributed components. **Page 4.**

■ **A mouse for laptop users** is expected to be announced today by Microsoft — with a money-back guarantee if the clamp doesn't fit the keyboard. **Page 16.**

■ **Project management software** is increasingly being used for systems development work. As a result, software vendors are branching out from traditional aerospace and engineering applications. **Page 55.**

■ **Fuzzy logic technology** is gearing up for business. Likely targets are companies whose applications contain a large number of variables or decision-making input from experts. **Page 69.**

■ **The dreaded pink slip** can be turned into a positive experience. IS professionals can learn to read the signs and prepare themselves for the termination interview — and another job — before the fact. **Page 77.**

■ **The used computer market** can be a treasure trove of bargains, but let the buyer beware. Purchasers should research and test all systems thoroughly before purchasing and watch out for hot computers to avoid getting taken to the cleaners. **Page 84.**

■ **On-site this week:** One year into its major imaging project, Northwest Airlines in Minneapolis is reaping the benefits of more accurate and timely ticket processing. **Page 31.** Elsewhere in the skies, US Air sticks to tradition in networking, using only LANs within IBM's SNA scheme. **Page 43.** The Consumer Price Index economic yardstick compiles 85,000 price quotes each month with the help of SAS Institute statistical software at the U.S. Bureau of Labor Statistics. **Page 32.** Artkraft Strauss has been in business nearly 100 years lighting signs in Times Square and elsewhere, but it didn't join the computer age until the late 1980s. **Page 37.**

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ICC, Cambex settle parts suit

BY NELL MARGOLIS
CW STAFF

BOSTON — What weeks ago appeared to be a building tidal wave of lawsuits by IBM Credit Corp. (ICC) against third-party computer leasing industry players receded last week as ICC and plug-compatible memory vendor Cambex Corp. settled their differences out of court.

However, certain terms of the settlement served as a reminder that customers as well as vendors could be sued by ICC.

In addition, one analyst said, Cambex's relief at being off the court docket may be short-lived and replaced by anxiety if the terms of the agreement cause customers to shy away from upgrading ICC-leased machines with third-party memory.

In a suit filed last month in Boston federal court, ICC accused Cambex of illegally stripping leased IBM equipment and reselling parts [CW, Feb. 11]. Last week's pact gave substantial benefits to both sides: for ICC, Cambex's pledge to refrain from any transfer of ICC property without the owner's written consent; for Cambex, ICC's promise not to pursue Cambex customers either legally or administratively with regard to the allegedly tainted transactions.

When ICC sued leading third-party lessor Comdisco, Inc. in January, industry observers noted that users as well as lessors could be seen as party to the allegedly illegal deals. At that time, the observers speculated that ICC could extend its legal onslaught to customers. Such speculation arose again one week later when ICC sued EMC Corp. and Cambex.

The countervailing argument was that while ICC might find it strategic to sue a competitor, the company would not sue its own users.

ICC, however, has consistently declined to back the extremity of either such premise. From President Harry Kavetas down, spokesmen have adamantly maintained that the firm is neither pursuing nor protecting any targeted group.

"These lawsuits are aimed at the initiators of illegal transactions," a spokesman reiterated last week. So far, he said, "we don't have any evidence that customers knew that parts were being dispersed in any illegal way." Does this mean that if such evidence arose, ICC might haul a customer into court? "We have never denied it," the spokesman said.

Under the settlement, Cambex's $5.9 million payment to ICC will defray the cost of ICC's replacing Cambex-labeled 3090 memory with IBM-made memory in user systems. Customer indemnification was critical to Cambex, said Chief Financial Officer Sheldon Schenkler. While still contending that his firm did no wrong, Schenkler conceded that seeing their supplier hauled into court made customers nervous about dealing with Cambex.

"The FUD factor — fear, uncertainty and doubt — was very large," he said. So were the estimates of what it might have cost to defend the suit, he added. A $30 million to $40 million firm with limited in-house legal clout, Cambex "could have lost even if we had won," he said.

Meanwhile, in light of both the ongoing suits and last week's settlement, "obviously, customers are going to be very shy about doing memory upgrades," said Thomas Donovan, president of Framingham, Mass.-based Technology Investment Strategies Corp.

One down ...

Highlights of last week's settlement agreement between ICC and Cambex:

- Cambex will not sell or sublease any ICC-owned computer or part without written permission from ICC
- Cambex will abide by the letter of ICC's leasing terms, including future subleasing amendments
- Cambex will pay $5.9M to ICC as the replacement cost for 3090 memory previously sold/subleased by Cambex
- ICC will drop all charges against Cambex and will not take action against the customers in any of the Cambex deals in question

... and two to go

- Comdisco's motion to dismiss ICC's Jan. 24 suit slated for April 24 hearing in Delaware Chancery Court
- EMC answered ICC's Feb. 1 suit with motion to dismiss. No hearing is scheduled as of yet

Source: IBM Credit Corp./Cambex agreement

CW Chart: Marie Haines

Apple wins key court round

BY JAMES DALY
CW STAFF

SAN FRANCISCO — Although it is likely to be months before the case is fully resolved, Apple Computer, Inc. won a round in its long-running copyright infringement suit against Microsoft Corp. and Hewlett-Packard Co. last week when a federal judge struck down several key defense motions that could have undermined Apple's charges.

U.S. District Court Judge Vaughn Walker upheld Apple's contention that the visual elements of the Macintosh screen display are original and were not part of the technology licensing agreement Apple inked with Microsoft in 1985. That pact was later used in the production of Microsoft's Windows 2.03 and HP's New Wave.

Apple sued Microsoft and HP in March 1988, charging that certain audio and visual elements of the Macintosh, including overlapping windows and the manipulation of icons, were not covered by the scope of the 1985 agreement. Microsoft and HP claimed the Macintosh interface is not entitled to protection because it was copied from earlier programs, including Xerox Corp.'s so-called Star interface.

Several analysts have said that the runaway success of Windows has come at the expense of Macintosh sales. If Apple prevails, however, it could draw large royalty payments out of Microsoft.

The ruling was important for Apple, analysts said. "It definitely removes a cloud that was hovering over the Apple front," said Benny Lorenzo, an analyst at Dillon, Read & Co. in New York.

Because Walker ruled that the few remaining questions of copyright infringement would be settled "in conjunction with an adjudication," Microsoft and HP also declared victory. "We are pleased that the court has further narrowed the issues," an HP statement read.

While the slow-moving legal drama packs great importance for the vendors, it is unlikely to affect user purchasing plans. "We have too much invested in our technological setup to get caught up in basing purchasing decisions on these courtroom squabbles," said Bill Walker, manager of decision support systems at Pan American World Airways in Rockleigh, N.J.

Others said they will wait for it to hit home before they are concerned. "Until I see a ruling that says Microsoft is going to recall Windows, I'm not worried," said Robert McPhee, a senior engineer in the imaging systems department at Du Pont Co.

Programmer overtime law clarified by Dept. of Labor

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. Department of Labor has issued regulations effective March 29 that implement and attempt to clarify the 1990 law exempting thousands of programmers from mandatory overtime pay.

Signed into law Nov. 15, the legislation exempts many computer programmers, systems analysts, software engineers and similar occupations from the traditional labor rules requiring 150% overtime pay for hourly workers [CW, Nov. 5].

Industry groups have argued that the law is needed because many employers prohibited programmers from working overtime and customers balked at paying 150% overtime rates for highly paid programmers.

The department said the exemption covers computer professionals who are paid on an hourly basis and make more than 6½ times the minimum wage, which will rise to $4.25 per hour on April 1. That translates to a threshold of $27.63 per hour.

In addition, virtually all computer programmers and analysts who are paid a guaranteed weekly salary will be exempt from mandatory overtime pay because the new law classifies them as exempt "professionals," said Harvey Shulman, general counsel for the National Association of Computer Consultant Businesses (NACCB). In the past, salaried programmers were exempt only if they qualified as administrative and executive employees.

For computer professionals to qualify for the exemption, the regulations said, they must perform one or more of the following primary duties:

- Create or modify computer programs or software related to machine operating systems.
- Design computer systems based on user specifications.
- Apply systems analysis techniques, including consulting with users, to determine hardware and software functional specifications.

Shulman noted that firms may pay computer professionals premium rates for overtime work, but it is not mandatory.

He added that the regulations are generally well written but said the NACCB will urge the Labor Department to fine-tune the rules to ensure the exemption covers software engineers, as Congress intended.

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Closing Arguments

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Today, some software companies claim that their software products are "open." They may even graft the word onto their product names. It is a confusing situation, but a clear definition of "open" is finally emerging.

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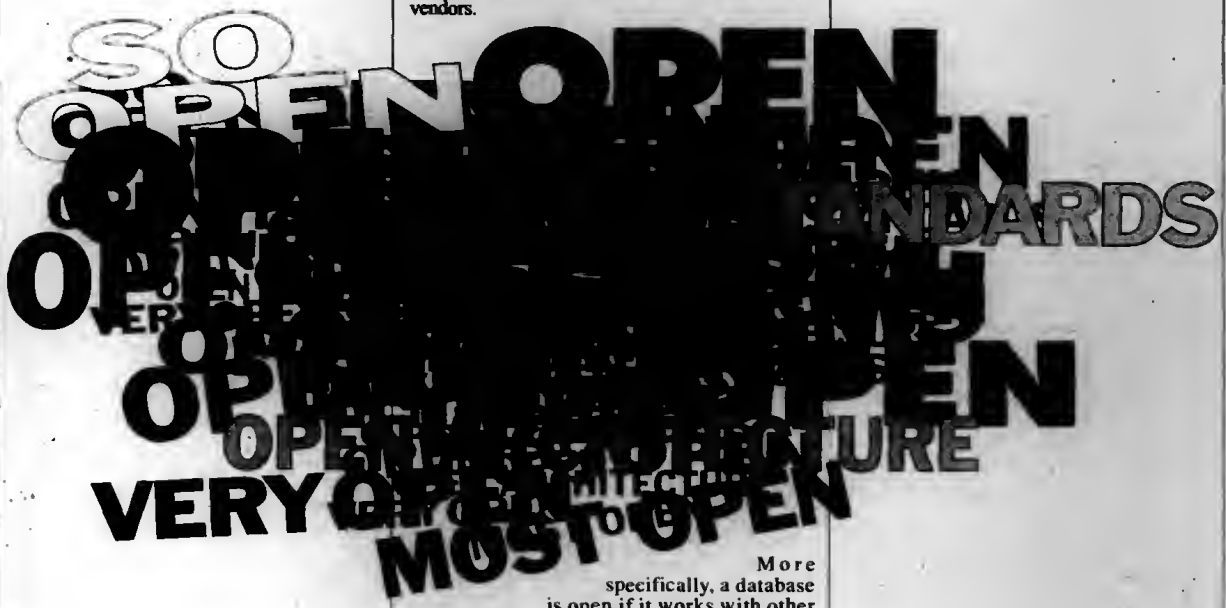

More specifically, a database is open if it works with other vendors' databases. For example, ORACLE provides access to IBM's DB2, SQL/DS and DEC's RMS.

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User gripes on OS/2 to spur IBM marketing blitz

BY PATRICIA KEEFE
CW STAFF

IBM will launch a flurry of OS/2 promotions and marketing deals within the next 30 to 60 days, according to sources who said the vendor is finally reacting to complaints about OS/2 packaging and pricing [CW, Feb 25].

There are also reports of what several people called a "big explosion-type" announcement in June similar to what Microsoft Corp. did for the Windows launch. Meanwhile, IBM will kick off OS/2 road shows.

It's about time, said observers, who noted that users are beginning to abandon the OS/2 Presentation Manager ship for Microsoft's Windows at a rapid rate. Developers have long since thrown in their lot with Windows (see story at right).

OS/2's fortunes have sunk so low that two weeks ago, attendees at a user group meeting in New York asked an IBM official not only whether the company was going to market Microsoft's Windows but also whether it had any plans to market OS/2. "That broke up the room," said Bill Zack, a consultant at Leveraged Technologies, Inc., the group's sponsor.

The speaker, John Soyring, IBM director of software development support for Personal Systems, told the New York users there will be "a lot of announcements" in the next few months, Zack said. Soyring acknowledged IBM has done a poor job of marketing OS/2.

Plugging OS/2

IBM is not going to market Windows, but it is exploring every avenue to ensure OS/2's future, Soyring said. This has included dispatching IBM executives to personally reassure wavering information systems managers and skeptical user groups.

In addition to providing financial incentives to developers, Soyring said IBM will "refresh" the OS/2 software developers kit so that it is smaller and faster.

Sources said IBM will also cut the price of both the kit and OS/2. "Three thousand dollars is a lot for a developer kit. At this point, they really should be giving it away," said Micrografx, Inc. Chairman Paul Grayson.

Sources said IBM is also preparing to bundle OS/2 with some or all of the Personal System/2 line, including new Intel Corp. 80386-based boxes that will reportedly "break the price point on the 386."

Burgeoning bundling

The bundling concept is expected to be extended to agreements with a number of compatible personal computer vendors and beyond the U.S.

On the software side, Soyring told the user group that IBM will port over the applications now packaged with Windows, including the clipboard and calendar.

Soyring also made it clear that IBM "stands ready to make good on OS/2 promises. If for some reason Microsoft won't, IBM will finish it," Zack said.

Frank Daubeck, a consultant at Communications Network Architects, said IBM may go even further by building hooks into OS/2 to provide support for non-IBM platforms and a wider girth of applications.

IBM is also counting heavily on the year-end formal release of OS/2 Version 2.0 to win over skeptics. Soyring told the user group IBM was "embarrassed" by OS/2 1.2. In comparison, IBM is working on a way to run Windows applications better than Windows itself, he said.

Users will find more usable memory in OS/2 Version 2.0's DOS box than they would have under DOS itself, Zack said. "IBM wants to make sure other vendors' virtual memory managers work in the compatibility box," he said.

Compaq eyes Silicon Graphics

Compaq Computer Corp. is reportedly considering buying as much as 20% of workstation maker Silicon Graphics, Inc. Analysts who follow the companies said they are convinced the sale will take place and expect an announcement in early April.

The synergy between the two firms is perfect, analysts said. Compaq, which acknowledged interest in the workstation market, does not have the skills and technology necessary to compete alone in that market, said Mark Stahlman, an analyst at Alex. Brown & Sons, Inc.

"Silicon Graphics is launching an effort to drop product prices by roughly 50%," Stahlman said. To do this, it needs expertise in volume manufacturing — an area in which Compaq excels, he said.

Silicon Graphics introduced a personal computer graphics board a few months ago.

Last month, the workstation vendor admitted to talks with Compaq and other companies on "strategic business relationships," but it denied involvement in merger talks.

RICHARD PASTORE

No limelight for OS/2 at show

BY JAMES DALY
CW STAFF

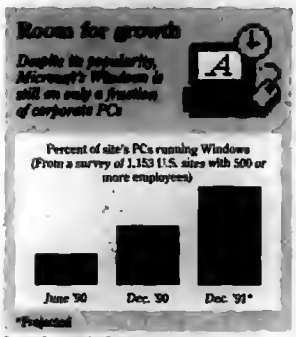
SAN JOSE, Calif. — Last week's Windows & OS/2 Conference offered the clearest indication yet that many users believe OS/2 and Presentation Manager are terminally ill, despite IBM and Microsoft Corp.'s insistence to the contrary.

"I'll be gentle and say the future of Presentation Manager is not bright," said Steve Morse, a senior technical officer at Manufacturers Hanover Trust Co. in New York. "No one is questioning OS/2's technological prowess, but the market momentum is simply not there."

Among the 15,000 attendees were some who came to see the latest and greatest offerings in the Presentation Manager world but discovered they were rare. Hundreds of firms proudly boasted about their Windows applications, while similar Presentation Manager packages were tougher to dig up.

Additionally, Windows was clearly the darling of many programmers who crowded s series of Windows workshops sponsored by the Software Entrepreneurs Forum and visited the nearly 50 firms exhibiting programming tools for the graphical user interface.

Several attendees noted that the success of Windows, coupled with Microsoft's influence in setting operating system standards, could deal a severe — perhaps mortal — blow to Presentation Manager. "OS/2's lack of developer support could be a potentially killer problem," said Mark Ryland, a software analyst at Washington, D.C.-based law firm Latham & Watkins and a self-confessed fan of OS/2 and Presentation Manager.



Source: Computer Intelligence

Such portentous rumblings have caused second thoughts for those once sold on OS/2 and Presentation Manager. "A few years ago, we believed that Windows was an immature system which would never amount to anything and [that] by 1991, 50% of the world would have OS/2," said Howard Dyckoff, a member of the Technical Services Division at Chevron Corp. "Now we're having a tough time convincing managers to move to OS/2 as a target platform."

While OS/2 may be technologically superior to DOS, tacking Windows onto existing DOS applications is a lot easier than committing the expense and manpower to get OS/2 running.

"Windows and Presentation Manager aren't dramatically different, but with Windows, all you have to do is slap down $80 for the program and away you go," said Walter Natzic, president of software development firm Aaron-Ross Corp. in Glendora, Calif.

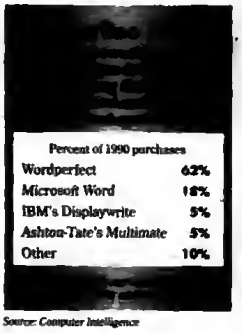
However, users are still not counting Presentation Manager out. "When we have multiprocessor-based PCs, then I think you'll see more interest in Presentation Manager — if it's around that long," said Richard Villa, a member of the IBM PC User Group in Huntington Beach, Calif.

Analysts said interest in Windows should increase this year when heavyweights such as Lotus Development Corp., Wordperfect Corp. and Borland International, Inc. release Windows versions of their most popular products.

Displaywrite, Xywrite on the way out

BY PATRICIA KEEFE
CW STAFF

IBM confirmed a joint development and exclusive marketing agreement with Xyquest, Inc. last week to develop a family of graphical word processors.



Source: Computer Intelligence

The pact signals the end of the line for future major releases of two character-based word processors: IBM's Displaywrite and Xyquest's Xywrite.

Users of these packages will be encouraged, possibly via low-priced promotions, to upgrade to the new product line, which is to be called Signature.

It may be too late for IBM. Brunswick Bowling & Billiards Corp. in Muskegon, Mich., has replaced Displaywrite with Wordperfect Corp.'s Wordperfect word processor. An East Coast power company that has several hundred Displaywrite users is moving to Wordperfect as well, according to the manager of end-user computing. "We know Displaywrite doesn't have a glowing future; IBM essentially said as much [to us]," he said.

IBM looked at moving Displaywrite into the graphical world but "didn't feel it could provide the appropriate solution for customers," said Tom Fornoff, manager of editor marketing at IBM. "Signature will be our strategic direction in word processing," he added.

IBM said it will continue to provide "minor upgrades," typically covering support for new printers, displays and desktop systems. Support for Displaywrite 4.2 will be extended to the end of 1992, when support for Displaywrite 5.0 is slated to end.

Signature is mostly under development at Xyquest. In fact, Xywrite IV will be repackaged as Signature, Xyquest marketing manager Judy Mintz said.

Xywrite users will be able to bypass the graphical aspects of the new package and return to character-based commands.

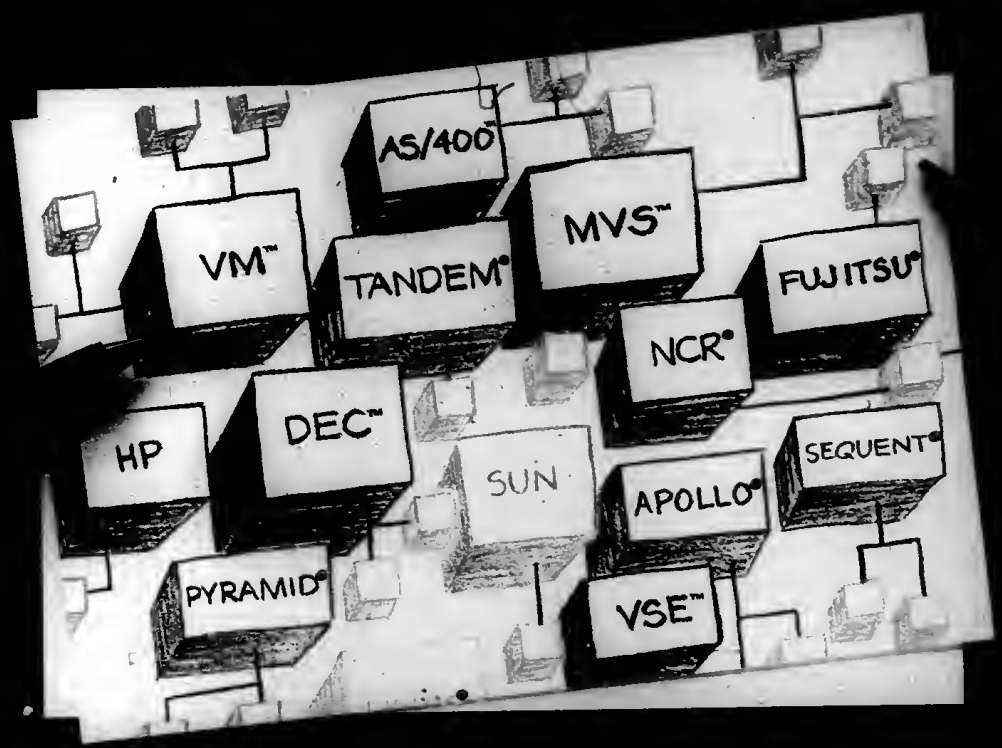
Big adjustment

Displaywrite users will face the biggest learning curve, she predicted. "They will not look the same," Fornoff agreed, adding, "We've spent a lot of time worrying about it."

He also claimed Displaywrite users told IBM that the only stringent requirement was file compatibility. Displaywrite document libraries will be fully supported, and Displaywrite files will be automatically converted. Users can also remap their keyboards to Displaywrite.

IBM and Xyquest plan to deliver Signature on three platforms: DOS, Microsoft Corp.'s Windows and OS/2. Displaywrite will not be ported to Windows. Signature is scheduled to ship next quarter.

Fornoff said the DOS version is in beta testing and the Windows version is in alpha testing. OS/2 will come later, Mintz said.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NEWS SHORTS

Price cuts for IBM disks

IBM cut prices last week by up to 5% on 3990s and 3390s, its high-end mainframe disk controllers and drives. The cuts affect some associated Escon products as well. This move comes just weeks after a previously announced price increase went into effect. "This is independent of competitive pressures," which have been minimal, said David Vellante, vice president of storage research at International Data Corp.

SAP strikes deal with EDS

SAP America, Inc., a subsidiary of SAP AG, has entered a marketing agreement with Electronic Data Systems Corp. (EDS). EDS will provide consulting services and joint marketing for SAP's R/2 System. The R/2 System is an on-line, real-time mainframe software system for business applications.

Client/server package duo

Cooperative Solutions, Inc. in San Jose, Calif., will announce a system software and multiuser applications development platform for client/server architectures this week at Esther Dyson's PC Forum. Called Ellipse, the product will run on OS/2 and is scheduled to ship in July. A Microsoft Corp. Windows-based version will be released later this year. Cooperative Solutions offers products for on-line transaction processing.

Compaq trims Deskpro price

Compaq Computer Corp. last week dropped the price of its Deskpro 386S Model 40 from $3,199 to $2,999. Sales of the 16-MHz Intel Corp. 80386SX box have fallen 50% from October to January, according to Storeboard/Computer Intelligence. Conversely, U.S. sales of the 20-MHz 386SX-based Deskpro 386S/20 have picked up 29% in the same period. This is a sign that users would rather pay extra for 20-MHz performance, observers said.

Ultimate blends Pick, Unix

Unable to decide between Pick and Unix? Now you may not have to. The Ultimate Corp. last week introduced Ultimate Plus, an operating system that combines Pick Systems' Pick and Unix features. The new system is primarily targeted at Ultimate's existing customer base, so they can migrate their Pick applications over to the newer Unix-based hardware.

Novell dims Lantern

Budget-bound managers of small networks seem to have made their voices heard at Novell, Inc. The network operating systems maker has introduced a low-end version of its Lantern monitor. Called Lantern LTD, it will monitor networks of up to 32 devices for $2,495, and it is shipping now, according to the Provo, Utah-based company. The original Lantern works on an unlimited number of workstations and is priced at $4,995.

Cadre reaches out to VAXs

Cadre Technologies, Inc. last week expanded the availability of its Teamwork/C Rev reverse-engineering product beyond the C language environment to Digital Equipment Corp. VAX/VMS users working with Fortran, Pascal, Basic, PL/1, Macro and Bliss. Teamwork/C Rev for VAX/VMS is available immediately and is priced at $7,500 for the Teamwork/C Rev processor and $1,000 per seat for browsing capability.

Toshiba ships delayed notebook

Toshiba America Information Systems said last week that it is shipping its Intel 80386SX-based notebook computer, the T2000SX. Toshiba had originally expected to ship SX notebooks in January. Prices are $4,999 for a model with a 20M-byte hard drive and $5,499 for one with a 40M-byte hard drive. Toshiba is also shipping the T1200XE, a new system based on a 12-MHz Intel 80286 chip. The T1200XE will weigh 8.1 pounds and will retail for $3,799.

More news shorts on page 91

NCR changes anti-AT&T tone

BY MICHAEL FITZGERALD
CW STAFF

DAYTON, Ohio — NCR Corp.'s latest defensive tactic against AT&T, the option of adding as many as eight new members to its board of directors, is unlikely to do more than slow AT&T's hostile takeover bid, analysts said last week.

AT&T may sweeten its offer because NCR stock, which reached a new high of 97⅝ Thursday, has been hovering above AT&T's $90-per-share tender offer for the better part of two weeks, the analysts said.

"The rise in the market has definitely made AT&T's offer look less interesting," said David J. Schofield, an analyst at Duff & Phelps Investment Research Co.

Other analysts agreed that AT&T's offer no longer looks as attractive and said NCR may be shifting its tone. Recent NCR advertisements have focused on issues of pricing, not the anti-AT&T ads that first appeared. NCR also sent its shareholders a letter that closed, "Don't hand over your investment in NCR for less than its full value!"

"There seem to be some qualitative changes in some of the stuff we're hearing out of NCR lately," Schofield said. That could be interpreted as NCR backing away from its earlier stance that the offer is unfair and instead pushing AT&T to boost its price, he said.

Charles Neuhauser, an analyst at Legg Mason Wood Walker, Inc., said that has been the case since NCR hired Goldman, Sachs & Co., known for its ability to squeeze top dollar from a potential acquisitor.

An NCR spokesman declined to comment but confirmed that NCR Chairman Charles E. Exley Jr. was in New York last week meeting with Wall Street analysts who have been recommending that their client sell to AT&T. He indicated Exley was attempting to convince analysts that NCR's stock would continue to outperform AT&T's offer if the company were left intact.

Under the laws of Maryland, where NCR is incorporated, NCR can expand its board from 12 to 20 members. If AT&T were to succeed in ousting part of NCR's board before the regular annual meeting, those members could rejoin the expanded board. This could create a situation in which Exley would be running the company despite having been voted out of office by shareholders.

Even with an expanded board and a reinstated Exley, Morrow said NCR's chances of remaining independent look dim. Adding board members "would just be another delaying tactic," he said.

Client/server craze driving growth in software market

BY JOANIE M. WEXLER
CW STAFF

WESTBORO, Mass. — Corporate zeal to distribute computing power across diverse hardware platforms is nourishing the software market, according to a recent Sentry Market Research study. Results indicated that the overall software market will grow 15% to $30 billion in 1991, according to the firm.

Sentry's November 1990 survey of more than 1,300 large corporate, government and university environments points to programming tools as the biggest software growth area. The reason, according to the company, is the exodus of applications from older hardware technologies to client/server configurations.

Users are voracious for software that will allow them to re-engineer their applications, said Suzanne Murphy, a survey project leader. "It is a lot of work to shift applications from a single-user environment to a client/server scenario," she explained. "That's going to keep the software industry healthy for some time."

While programming tools showed the highest growth potential, commercial applications still gobbled up the largest portion of the average respondent's software budget at 41%. Data center management software followed with 29%. Development tools and networking software were third, each grabbing an average of 13% of respondents' software budgets.

Survey results showed the mainframe portion of software budgets to be steeply declining while the personal computer portion is expected to more than double between 1989 and 1991.

However, "the mainframe is not a dinosaur," Murphy said. "Companies are just getting smarter about what we prefer to call 'right-sizing' rather than 'downsizing.' The mainframe still has its place for certain applications; it makes sense to run others on smaller machines within the departments that are using them."

One way to spend a million dollars

Software expenditures expected to grow while platform allocations shift

Average packaged software expenditures per site (in thousands)

	1989	1990	1991*
Mainframe	$611	$576	$566
Midrange	$192	$228	$262
Workstation	$116	$134	$169
PC	$162	$396	$470
Total	$1,081	$1,334	$1,487

*Projected

Source: Sentry Market Research

CW Chart: Paul Mock

Kuwait

FROM PAGE 1

telephone calls from job seekers that it now intercepts them with an automated response system. Bechtel said it is accepting resumes in data processing, contract management and other administrative fields.

IBM has also fielded many calls from people seeking work in Kuwait, but spokesman Mac Jeffery said he does not expect any large-scale hiring program. IBM has been awarded a small contract to supply a mainframe and peripherals for the Kuwaiti recovery program and hopes to receive other computer contracts now that its Kuwaiti dealer, Khorafi Business Machines, is back in operation, according to Jeffery.

Computer Sciences Corp. said it received a $1.3 million contract to plan for rebuilding the Kuwaiti government's IS infrastructure.

Andersen Consulting won a contract to restore the facilities and systems at Kuwait Airways Corp. "Ultimately, computer systems will be part of the work, but the initial work is a six- to eight-week damage assessment," said Michael Gelhausen, director of Andersen Consulting's airline industry practice.

U.S. and Kuwaiti government agencies have been swamped with calls from U.S. firms seeking a piece of Kuwait's recovery business. The U.S. Department of Commerce last week opened the Gulf Reconstruction Center, an information clearinghouse in Washington, D.C., that U.S. companies can call for advice on winning contracts. A spokeswoman said the center has fielded more than 5,000 calls.

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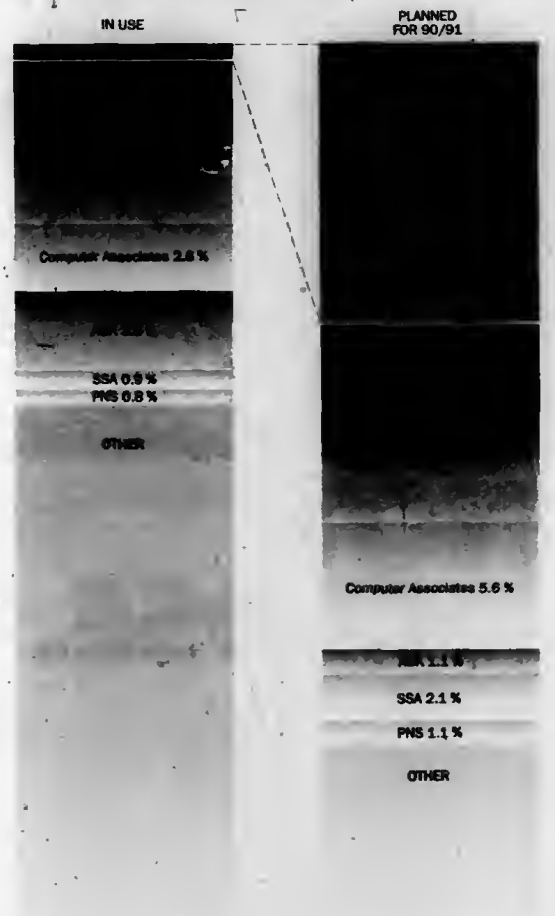

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IBM to offer octet of RS/6000 products

BY MARYFRAN JOHNSON
CW STAFF

IBM will deliver on its pledge to flesh out the RISC System/6000 workstation and server line with the announcement this week of eight new products for its premiere Unix-based computers.

IBM will release three additional systems: an upgraded X terminal, a new graphics accelerator and a trio of storage products, industry sources said.

Users will also reportedly be able to get upgrades that will boost the clock speed of the low-end Powerstation 320 from 20 to 25 MHz.

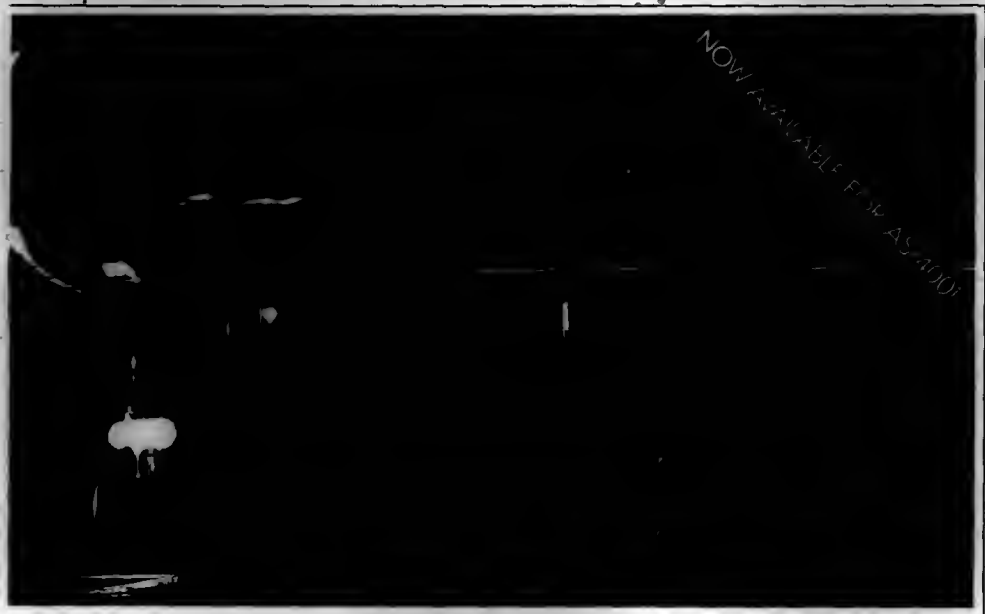
"I think [IBM] felt like Sun, while not quite up to the performance of the RS/6000, was getting awfully close, and they wanted to jump ahead a bit," said Steve Cross, systems administrator at Memphis-based Delta Metals Co., a steel processing firm that uses a Model 320 for accounting, inventory control and order entry tasks.

The new systems include a high-end rack-mounted server that is more powerful than the current top-of-the-line Powerstation 930 and low-end desktop systems in workstation and server configurations. The new server will reportedly run at 40 million instructions per second (MIPS) compared with 34.5 MIPS for the Powerserver 930.

The Xstation 130 terminal, upgraded with Texas Instruments, Inc.'s 34020 graphics chip, will double the speed of the Xstation 120 and cost less than $5,000, giving IBM a "competitive response" to Sun Microsystems, Inc., Digital Equipment Corp. and Hewlett-Packard Co., said John Dunkle, president of Workgroup Technologies, Inc.

"IBM is bringing to fruition the promises it made with the [February 1990] announcement of the RS/6000: to continue migration with faster performance and better price at both the low end and high end," Dunkle said.

Analysts said the new low-end desktop system will surpass the performance of the $14,000 Model 320, yet it is expected to cost several thousand dollars less.



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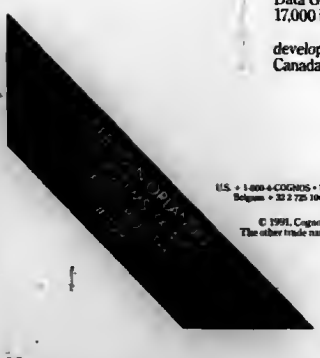

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IBM Business Partner

Low-cost PBX under wraps

BY JOANIE M. WEXLER
CW STAFF

A purported upcoming announcement from Northern Telecom, Inc. could bring digital switching capabilities to small offices now equipped with nonprivate branch exchange (PBX) analog telephone systems.

Technology Investment Strategies Corp., a market research firm, said it has learned that Northern Telecom plans to unwrap an inexpensive, wall-mounted digital PBX in midsummer. Senior analyst Doreen D. Austin said such a product would "throw the key system market into a tailspin."

Switching traffic

A key system is a low-end analog PBX alternative used for switching voice traffic only.

The more costly PBX switches larger numbers of telephone calls than the key set, and both types of switching systems connect to outside communications lines. A digital PBX allows most switch operations to be controlled by software and can switch data in addition to voice.

"If the [new] PBX does what they say, it will give small offices access to Integrated Services Digital Networks, packet switching and RS-232 from their phones without investing in a heavy-duty PBX," Austin said.

Austin said a wall-mount design would mean users would not have to "give away any real estate" for PBX functionality. She said she was told the PBX will include a T1 interface and compatibility with Northern Telecom's digital station equipment.

Austin said AT&T and TIE/Communications, Inc. would be most threatened by such a PBX.

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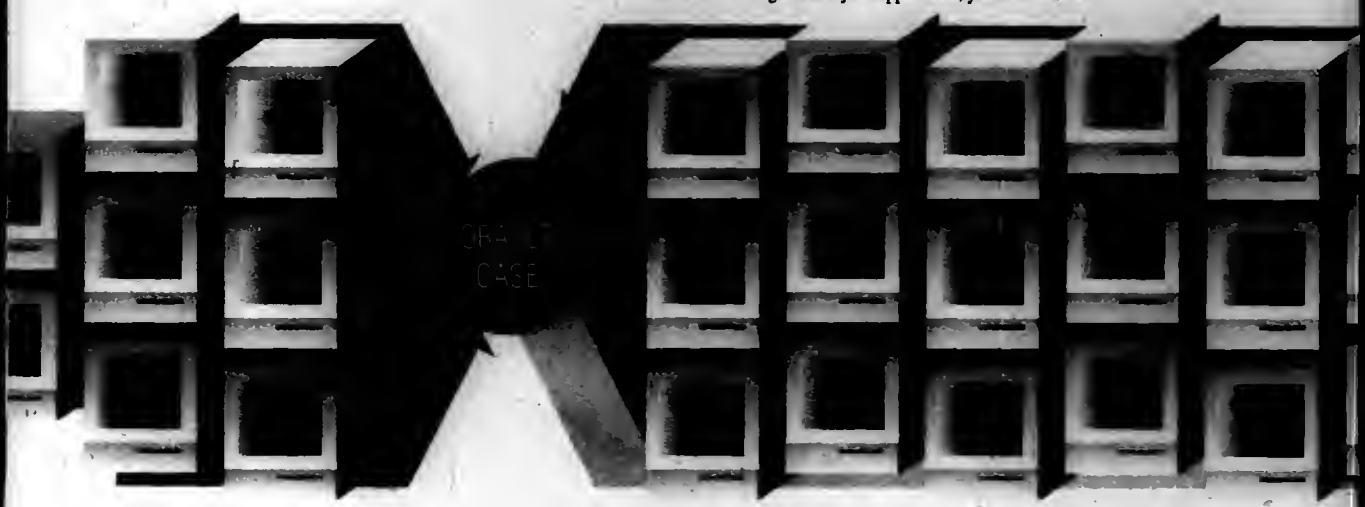

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Kraft drives vendor integration efforts

BY ELLIS BOOKER
CW STAFF

CLEVELAND — Sometimes the best way to cook up a computer-integrated manufacturing solution is to put two of your biggest vendors on the fire together.

That is what Kraft General Foods, Inc. did when it brought Allen-Bradley Co. and Hewlett-Packard Co. into a room last year and told them it wanted tighter integration between the Allen-Bradley controllers on its factory floors and the HP Unix processors in its data centers.

Last week, with Kraft officials on hand, Allen-Bradley and HP announced a strategic alliance and their first high-performance, tightly integrated manufacturing solution.

The product is a networked version of Allen-Bradley's Data Tape Library (DTL) application programming interface. Network *DTL* links Allen-Bradley's Pyramid Integrator with HP's 9000 series Unix host over an Ethernet network.

"In the old days, just to wire a plant would have cost a couple hundred thousand dollars," said Chris Jones, assistant director of engineering at Kraft in Chicago.

Kraft has had Allen-Bradley programmable controllers since 1975 and standardized on HP systems as department-level supervisory controllers in 1985.

"But the sort of projects we do now requires an integration that is much more complex," Jones said.

Network DTL uses an Ethernet backbone running Transmission Control Protocol/Internet Protocol (TCP/IP). This client/server approach is approximately 50 times faster than the traditional method of connecting its devices to host computers over RS-232 connections, according to Allen-Bradley.

Two versions of the software were announced last week: Network DTL HP-UX for HP computers running under Unix and Network DTL V for Digital Equipment Corp. VAX systems under VMS.

The customer comes first

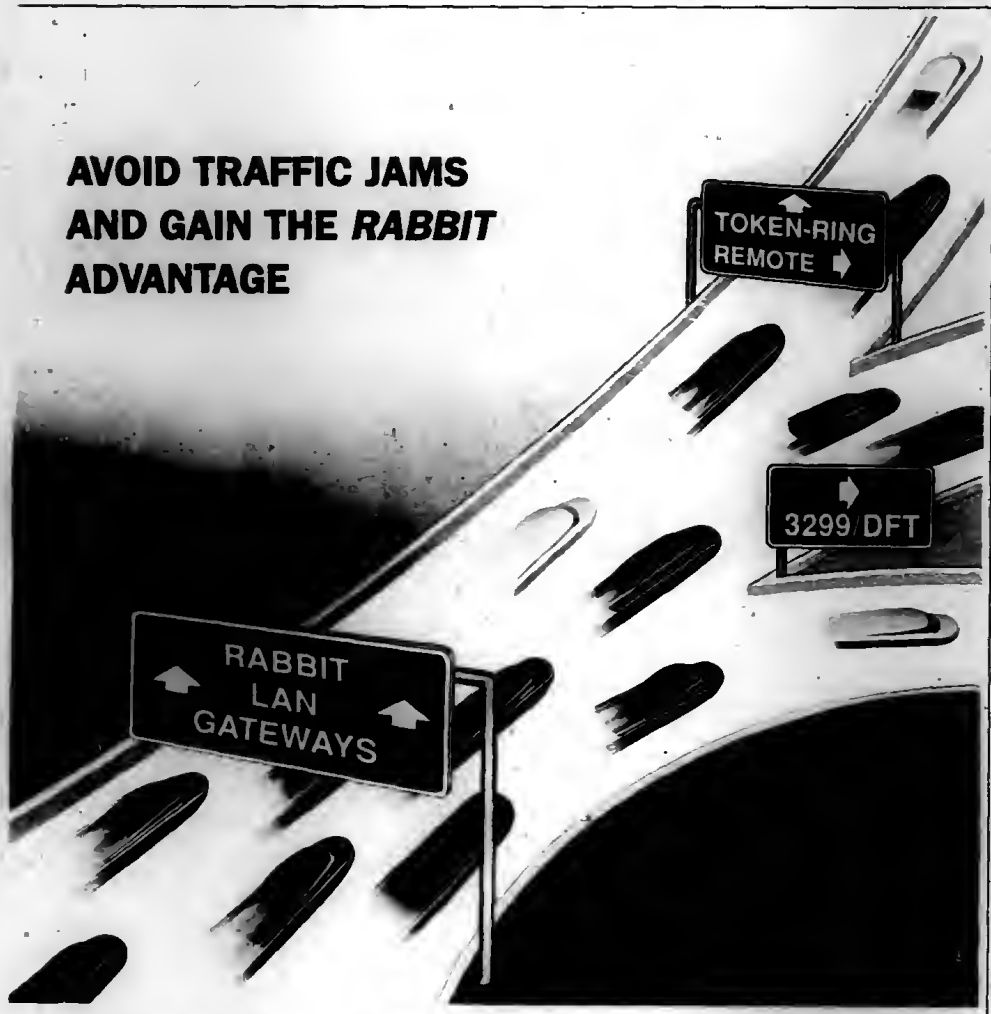
Allen-Bradley officials stressed that the choice of TCP/IP was "customer-driven" and that they were still fully committed to Manufacturing Automation Protocol/Open Systems Interconnect, which is the international protocol for factory environments.

The relationship with HP — which claims to have a 44.8% share of the market for Unix in manufacturing — is analogous to the one Allen-Bradley established with DEC in 1988.

That alliance resulted in the Pyramid Integrator, the single box containing a DEC Microvax and Allen-Bradley's real-time controller boards.

Allen-Bradley President Don Davis suggested last week that the company would continue to answer its users' calls for connectivity to leading computer platforms, including the IBM Application System/400.

But Martin Piszczalski, director of the Manufacturing Automation Planning Service of The Yankee Group in Boston, said the Allen-Bradley/IBM team is "not very warm and close" and that a more likely method of linking to the IBM world might involve a Microsoft Corp. OS/2 or IBM AIX interface.



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HEWLETT PACKARD

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Sun, surf

FROM PAGE 1

want to. It's been quite a change," he said.

Geis, who is not married, did have an incentive to choose the island of St. John. His parents live in a mountaintop home with a panoramic view of Fish Bay — along with a convenient studio apartment.

Geis programs using an Intel Corp. 80386-based 20-MHz personal computer and a minicomputer from Scientific Micro Systems that he describes as "a takeoff from a [Digital Equipment Corp.] PDP 11/73." He uses that machine for the majority of his work.

Geis said that he installed a dedicated telephone line for his telecommuting, but he does not program on-line using Machine Industries' mainframe. Rather, he does the work and then uploads the data using a 9.6K bit/sec. modem.

The idea of being able to work with a keyboard at one hand and with a pina colada in the other is enticing, but such deals are certainly the exception.

"If the average programmer walked into the boss' office and said, 'I've had it. I want to move to Cancun,' they would be shown the door," according to Gil Gordon, the editor of "Telecommuting Review," a Monmouth Junction, N.J.-based newsletter.

Gordon said that such an exotic setup is feasible only if the employee is highly trained, can do virtually all of the job long distance and possesses a hard-to-find skill.

Nancy Rawal

"I JUST GOT TIRED of the traffic and the routine and the accidents on the freeway. Basically, I just get up when I want to and program when I want to. It's been quite a change."

JACK GEIS

A perfect match

Geis certainly fills the bill. Seventy-five percent to 80% of his work is done in a language called NCL/APT, for which he estimates there are 200 users.

APT is a language developed in the aerospace industry in the late '50s, and NCL/APT is a subset developed approximately six years ago.

Machine Industries, which is a direct supplier to such industry heavyweights as The Boeing Co. and McDonnell Douglas Corp., uses it extensively.

Although his lifestyle sounds too good to be true, Gordon said that he has mixed feelings about the idea of telecommuting from such a paradise.

"My concern is that if we focus on [these kinds of deals] too much, it takes away from mainline telecommuting. For the average office worker, [telecommuting] is more a dream than a reality."

Still, Geis is not arguing too hard with his particular reality. You may find him in his office pounding the keyboard of his computer.

Then again, that water does look mighty fine.

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Technology addresses clash of mice and menus

Devices can also be used on desktop PCs

BY RICHARD PASTORE
CW STAFF

Tiny laptop computers and space-hungry mouse pointing devices have not typically gotten along. However, with portable personal computer power growing along with the popularity of graphical interfaces, some vendors are coming out with ways to help the two coexist.

Microsoft Corp. today will unveil its Ballpoint Mouse, a trackball/mouse hybrid that clamps onto the edge of many portable PC keyboards.

The mouse uses a two-pronged adjustable clamp that locks into the gap between the outermost keys and the keyboard's edge. The mouse, in turn, attaches to the clamp, which can pivot between 0 and 90 degrees, depending on user preference.

Microsoft's Ballpoint Mouse *attaches to laptops or stands alone on the desktop*

Fits several models

The Ballpoint Mouse was designed to fit on portable models marketed by Compaq Computer Corp., Toshiba Corp., Zenith Data Systems, NEC Technologies, Inc. and Grid Systems Corp. Microsoft said it will refund the $175 purchase price if the clamp does not fit a particular keyboard.

Compaq, in an unusual exclusive bundling move, will ship the Ballpoint Mouse free to users who buy Compaq LTE or SLT portables between today and June 30. The mouse will only be available through Compaq during this period. "The product fits hand and glove with laptops," said Compaq North America Vice President Ross Cooley. Use of mice is increasing among LTE owners, he noted.

Last month, joystick maker Suncom Technologies in Niles, Ill., announced its own answer to the portable pointing problem. The product is a mouse/joystick hybrid called Icontroller. The $100 device attaches to keyboards via a Velcro-like strip.

Both the Microsoft and Suncom devices can be detached from the keyboard for separate use on desktop PCs.

Another alternative is to buy a portable with an embedded pointer. Apple Computer, Inc. designed a trackball into its Macintosh portable keyboard. However, this option is not viable for smaller laptop and notebook-size models. For them, the Isopoint bar is offered. The sliding, spinning, pencil-thin bar has been incorporated into a number of portables, including the Macintosh-compatible laptop from Outbound Systems, Inc.

Microsoft acquires E-mail vendor

BY JIM NASH
CW STAFF

Tighter integration of electronic mail with other applications via a standardized interface may be one fruit of Microsoft Corp.'s purchase of E-mail vendor Consumers Software, Inc. The acquisition, which was announced last week and is expected to be formalized this month, will give Microsoft its first personal computer-based E-mail package.

Specific terms of the agreement have not been released. Microsoft has said that it intends to market Microsoft Mail for PC Networks, based in part on Consumers Software's Network Courier E-mail software.

To date, Microsoft has only marketed a mail application for Apple Computer, Inc. Appletalk networks.

"I think all the networking companies have recognized that [network administrators] want tightly integrated applications for their networks," said Paul Flessner, manager of distributed systems technology at Baxter Healthcare Corp. in McGaw, Ill.

"The value [of the acquisition] is that a key applications maker used by many people is integrating E-mail," said Dave Taylor, an analyst at Gartner Group, Inc. in Stamford, Conn. Taylor said this may be the end of E-mail being perceived as a separate store-and-forward device. More concretely, it would bring Consumers Software's X.400 expertise together with Microsoft's application integration knowledge.

Steve Madigan, a senior programing manager at Microsoft's networking unit, said Consumers Software in Vancouver, B.C., will serve as a technology source and a ready-made E-mail installed base. But, Madigan added, the purchase is part of a larger project by Microsoft to develop standardized application interfaces under Windows Version 3.0.

A spokesman for Consumers Software said that the privately held company has 800,000 users worldwide.

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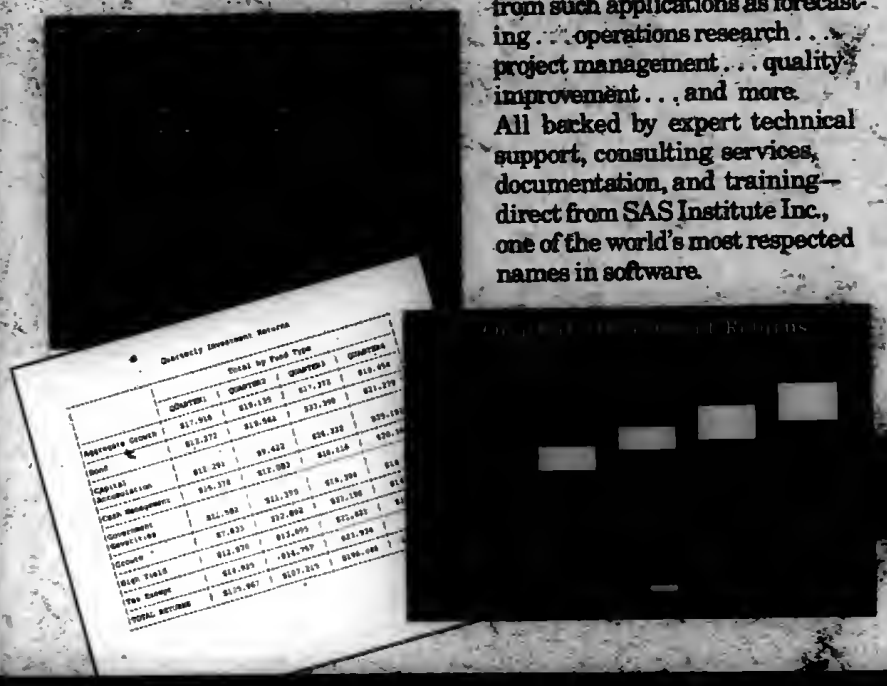

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TECH TALK

Snappy neural nets

■ Adaptive Solutions, Inc., a Beaverton, Ore., neurocomputing technology company, introduced a neurocomputer system that it claimed will speed learning in neural networks 1,000-fold. The new system, called the Connected Network of Adaptive Processors (CNAPS), consists of a CNAPS server, a neurocomputer for a Unix network and Codenet, a software development environment. The server exceeds supercomputers in raw performance on neural networking applications, the company said. The server runs in a learning mode of more than 1 billion connection updates per second, allowing developers to train some neural networks in seconds rather than hours.

Little lasers

■ A visible-light laser diode with a wavelength of 650 nanometers (one nanometer equals 1 billionth of a meter) went on sale last week, according to Toshiba Corp., the laser diode's manufacturer. The shorter the wavelength, the brighter the light that the laser appears to emit. The new diode's perceived brightness is four times greater than that of other diodes currently available, Toshiba said. The firm said the laser diode is useful for handheld bar code readers or scanners on manufacturing lines. Other promising applications for the device include laser printer printing heads, measuring instruments and tape-top, bar code reader systems.

Light across the ocean

■ Engineers at AT&T Bell Laboratories have demonstrated that it is possible to transmit light wave signals across transoceanic distances without the costly electronic regenerators used in today's systems. The engineers reported a low-error-rate transmission of light wave signals at 5G bit/sec. over a distance of about 5,400 miles. They also demonstrated a 2.4G bit/sec. transmission over a distance of 12,600 miles.

Object databases within users' sight

New levels of productivity may be orchestrated with multimedia packages

BY MAURA J. HARRINGTON
CW STAFF

Scott Matthews

Think how productive computer users could be if each system was tailored to individual work habits and was able to pitch in with office chores even before the users began their morning commutes.

Personalized knowledge-based systems could automatically search databases during the night, sort video messages sent by electronic mail and verbally alert users to voice mail messages left after working hours, for example.

What may be the ultimate productivity tool is not yet available, but some vendors are closing in on ways to boost productivity with entertaining, easy-to-use multimedia-based applications.

Picture this

The applications are based on an emerging database language concept called object-oriented programming, a way of storing information using objects or icons as key identifiers. Each object represents an individual set of rules. Unlike relational databases, the code assigned to a rule can be easily changed, updated, reused or modified without affecting the database as a whole, according to experts.

Some information systems managers are already experimenting with object-oriented programming technology despite a lack of standards for multimedia hardware and software. Programmers who are familiar with object-oriented programming techniques are also rare, these managers said.

However, the potential of object-oriented programming and multimedia technology is too alluring to resist. "We can't afford to wait for the software and hardware companies to work out their standards problems. We have to move on and build our own system for tomorrow today," said Bill Bysinger, director of the IS department at Aldus Corp. The company is building an internal worldwide networking system on an object-oriented, client/server architecture even though there are no standards for tools or definitions of how to build an object, Bysinger said.

Bysinger said he hopes to complete within two years one application that would enable users to send and receive video and audio messages via E-mail. Also on tap is an "intelligent agent" that would sit on a file server and be used to personalize each desktop computer on the network. Object-oriented and artificial intelligence programs within a database would incorporate a user's work profile, habits, responsibilities and other information.

"An intelligent agent means that my server knows me; it knows my work patterns, and it uses what we call knowledge technology to help me be more productive," Bysinger explained.

Macromind, Inc., Farallon Computing, Inc., Itasca Systems, Inc., Servio Corp. and other software vendors have introduced applications written in object-oriented programming languages designed to allow users to incorporate sound, images, graphics and other forms of media into a database. The drawbacks are that the programs are expensive and lack standards needed to appeal to a wide audience, according to experts. Most of the packages are aimed at Apple Computer, Inc. Macintosh users.

"Until some standards are put in place, this technology will never really fly in the general market," said Nick Arnett, chief analyst at Santa Clara, Calif.-based Multimedia Computing Corp.

Software vendors agreed that the lack of multimedia and object-oriented programming language standards are to blame for a lack of off-the-shelf products, but they attributed the problem to the newness of the market.

Convincing argument

Users will also have to be convinced that the technology is worth investing in, according to Harvey Newquist, chief executive officer of Scottsdale, Ariz.-based Relayer Group, a market research firm and publisher of two multimedia trade publications.

"In order for this to really take off, corporate MIS is going to have to realize the kind of [database] language used in the past is not dynamic enough to manage the type of corporate document structure needed in business today," Newquist said.

"This is all very new technology, so I think it will be a couple of years before there are general object-oriented database applications available to MIS," said Bill Hoffman, president of Itasca Systems.

Currently, there are two standards committees working on defining standards for object-oriented database technology: the Object-Oriented Database Task Group, part of the American National Standards Institute, and the Object Management Group, an independent consortium of vendors and users. Both groups are working independently and together to devise the definition of an object and the definition of how objects talk to each other, Hoffman said.

Hardware standards that would allow different media to work together must also be developed, according to Dean McCarron, an analyst at In-Stat, Inc., a market research firm in Scottsdale.

"Multimedia is a combination of hardware and software; both have to work together in order for it to really fly," McCarron said.

Growing like a weed

Meanwhile, the multimedia market is still expected to grow at a healthy rate from now through the end of the decade, according to a study published by In-Stat in December.

The study revealed that the interactive digital multimedia computing market will grow in three major stages during the next 10 years.

The first growth stage, expected to last through 1994, will be made up primarily of sales of specialized commercial and military multimedia databases and interactive programs incorporating sound, still- and full-motion video, graphics, animation and text. Revenue is expected to grow from $22 million by the end of 1991 to almost $200 million by 1994, analysts said.

The second and third growth stages are expected to focus on the office/desktop computing arena and the consumer products market, respectively, according to the report. If all goes according to In-Stat's predictions, the digital multimedia computing market will be worth at least $1.65 billion, according to the study.

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EDITORIAL

Rule of law

Quick, name the industry whose structure and form have been shaped to the greatest extent not by entrepreneurs but by judges.

If you said anything but the computer business, you're wrong.

A generation ago, the courts declared that IBM had to unbundle its hardware and software offerings, thereby spawning a business that today is the fastest growing economic segment in the country.

While the government tried very hard (and failed) to break up IBM through the courts, it did succeed in operating through the judiciary to fragment AT&T, thereby producing today's burgeoning networking and communications business segment.

At times, the legal process seems fairly straightforward. For example, IBM's dispute with Cambex, settled out of court last week in IBM's favor, appears to have turned easily on the issue of contract language interpretation.

However, the complexity of certain other suits settled recently and of others still pending will rest on highly subjective judgments rendered in the absence of precedents. Specifically, the look-and-feel copyright infringement suits present the courts with new dilemmas. And the outcome of the suits, most notably Apple's suit against Microsoft, or more precisely, the Macintosh interface vs. Windows, can have a large impact on millions of users.

There is no great body of contract interpretation to guide the judge. In a copyright infringement case decided in favor of Lotus last year, the judge ruled that the two defendants had simply lifted large quantities of Lotus' work and inserted it into their own programs. This clarity, based on usurpation of program code, is absent in the Apple/Microsoft case.

Eventually the judge will decide how to shoehorn concepts that are entirely novel to the courts, like look and feel, into copyright law that has centuries-old roots.

But what the judge will really decide is something that looks and feels more like the rights of the individual vs. what's right for the masses by way of standards promulgation.

Here's where the courts' actions in the past might provide, if not a precedent, at least a glimpse into the outcome of the Apple suit.

If you look at the really big court actions, such as IBM's unbundling and the breakup of AT&T, there can be no argument that the actions produced far more competition. And no one disagrees that more competition is good for all. And despite the rulings, both AT&T and IBM are not only still in business, but they are very sound and innovative companies as well.

So although the early indications in the Apple/Microsoft matter, as in the final judgment in the Lotus case, weigh in favor of the plaintiff, history has found the courts searching for the elusive win-win, with the preservation of a greater economic good heavily influencing the look and feel of the final decision.

LETTERS TO THE EDITOR

No driver

Your article about Lotus' 1-2-3 Release 3.1 [CW, Feb. 4] contained a statement by Paul McNulty at Lotus indicating that a Datalens driver is "available" for use with an Oracle database. I beg to differ.

The only Datalens driver that is available for use with an Oracle database is limited to 1-2-3 Release 3.0 on a VAX. There is no Datalens product that is compatible with 1-2-3 Release 3.1 and an Oracle database.

Phil Rice
President
Oracle/Lotus SIG
Englewood, Colo.

Interface overkill

Regarding comparisons of Apple, Windows and OS/2, I am the IS director in a shop with an OS/2 1.2 LAN Server local-area network having both DOS and OS/2 requestors. We are also a mainframe shop, with the LAN attached to an IBM 3090 running under MVS/XA. Soon we will migrate to Version 1.3 of the OS/2 Extended Edition product.

In the case of many business users — those who type a memo, then check a calendar, then go to lunch — OS/2, Windows or possibly even the Mac, are overkill. They don't need multitasking. They don't even really need a graphical interface.

Where OS/2 shines is in the mixed or multitiered environment. With OS/2, you can have access to on-site support from trained IBM systems engineers. Admittedly, except for power users, it has been difficult to justify the hardware investment needed for implementation of a stand-alone OS/2 machine, unless you also need multiple concurrent mainframe sessions and/or a database manager. But even this is becoming less of a factor with shrinkage in both memory prices and the memory hunger of OS/2.

Britt Hagen
Springfield, Ill.

Academic pressure

Alan Radding's article on information systems in education "Higher pay vs. higher education" [CW, Feb. 18] is too highly abstracted. There are at least two points worth noting that actually better characterize IS in education.

1. Particularly with administrative systems, the stresses and emphases are very closely equivalent to those in the corporate world. I don't detect that users are any less angry when systems don't perform or are not delivered as expected.

2. IS professionals in education feel strongly connected to the goals of the enterprise. We are part of a team that is doing everything it can to help individuals build toward their futures.

Albert L. LeDuc
Director, Computer Services
Miami-Dade Community College
Miami, Fla.

Big Brother?

Mark Hall's "Purging information overload" [CW, Feb. 11], resembles a 1991 advocacy for Orwellian Newspeak and should be resisted at all costs.

How dare he use terms such as "landfills of our minds" and "clean up the muck in each of our heads"? Speak for yourself, Mr. Hall! His proclamation for the "need for conservation in the information industry" is a euphemism for censorship. His "truth" resembles a call for his version of politically correct thinking, which in itself is a recipe for tyranny.

Access to many sources of information *is* freedom. The last thing this country needs are self-serving elites such as Mr. Hall limiting that access. If there was only one dictionary, one book publisher and one computer magazine, he probably would not have had the opportunity to publish such trash in the first place! What's a synonym for hypocrite, Mr. Hall?

Gary W. Neidhardt
Software Advantage, Inc.
Nashua, N.H.

PC or not PC

Regarding your recent article "Mobile PCs weathering Desert Storm" [CW, Feb. 18], this article has a picture that depicts the "Unisys TACCS PCs." These are in fact not PCs at all, but Unisys B26 BTOS workstations with built-in networking and hardened for combat conditions! All micros are not PCs; this is much too limiting a label for BTOS/CTOS systems and describes a very specific hardware architecture.

David K. McClanahan
Oak Ridge, Tenn.

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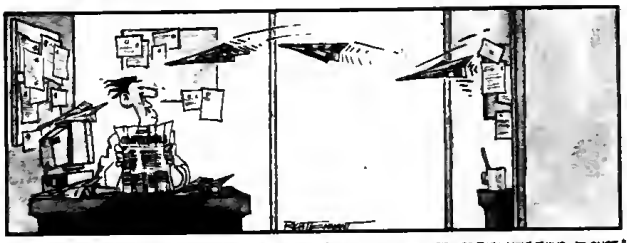

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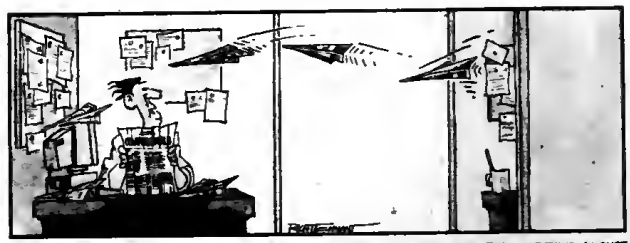

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   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 69. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Distr./Retailer
   - 78. User: Other _____
   - 95. Vendor: Other _____ (Please specify)

2. **TITLE/FUNCTION** (Circle one)
   IS/MIS/DP MANAGEMENT
   - 19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt., Dir./Mgr. PC Resources
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Mgrs., Supvr. of Programming, Software Dev.
   - 32. Programmers, Software Developers
   - 90. Sys. Integrators/VARs/Consulting Mgt.

   OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgt.
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales & Mktg. Management

   OTHER PROFESSIONALS
   - 70. Medical, Legal, Accounting Mgt.
   - 86. Educator, Journalists, Librarians, Students
   - 90. Others _____ (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant
   - A. Mainframes/Supermins
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Local Area Networks
   - F. No Computer Involvement

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Research constricted by inadequate funding

LEON LEDERMAN

America'a academic researchers are feeling the effects of limited federal funding, and the future of U.S. scientific achievement may be at stake. Researchers across the country report that a lack of adequate funding has slowed research and even altered the ways researchers pursue answers to the nation's scientific problems.

Concerns about support for U.S. academic research have been heard with increasing frequency during the past few years. When I became president-elect of the American Association for the Advancement of Science (AAAS) in February 1990, I decided to look more deeply into the situation. I felt it was important for the largest general scientific organization in the country to be part of the solution to this problem.

An informal survey of many of the "best and brightest" in 50 of our most prestigious research universities confirmed my expectations of trouble. The nearly 250 letters that poured in revealed a depth of despair and discouragement that I have not experienced in my 40 years in science.

The letters described scientists who cannot get funding for lauded research, who cannot afford to train gifted graduate students and who must use outdated equipment in inadequate facilities. Instead of the traditional optimism of researchers, the letters revealed a profession beset by flagging morale, diminishing expectations and constricting horizons.

These letters sent a message that needs to be heard broadly. If the mood persists, it will infect the graduate students and inevitably spread to frustrate the heroic endeavors so many of us are making to upgrade the nation's science education. That is why I wrote a comprehensive report to the board of directors of AAAS, urging that the organization lead the effort to improve the situation.

The principal source of the morale problem is no mystery. It appeared in letter after letter. It is essentially a lack of funding. For many scientists, the difficulties of obtaining research support are beginning to overshadow the rewards of actually doing research. However, the question remains as to why funding is inadequate when federal support has risen significantly during the past seven years.

Unfortunately, recent increases have not offset the earlier years (1968-1983) marked by decreasing or level funding. Neither have they accommodated to the increased sophistication needed to cope with as-yet-unsolved problems, burgeoning new fields such as high-temperature superconductors, molecular genetics, organometallic chemistry, neurobiology, artificial intelligence and so much more.

I focused on the universities because the bulk of basic research and a significant fraction of applied research is done there and because that is where all the research and application scientists and engineers receive their training.

Clearly, however, the industrial and national laboratories must be part of any new national science policy. The conclusions of the AAAS report include the following:

1. There is a distinct possibility that the infrastructure of academic research will actually begin to crumble as the very best professors retire early, concentrate wholly on teaching, change occupations or even emigrate. Whereas some of these changes can bring benefits to teaching and to industry, the effect on academic research can be calamitous.

The message to students is that a career in research can be frustrating to even the very best scientists in even the best universities.

2. The beneficial accomplishments of academic, basic *and* applied research have been tremendous — contributing to our culture, to the quality of life and to our economic prosperity. Equally important is the education of scientists who man the industrial and national laboratories as well as the colleges and science administrative positions in industry and government.

Martin Huntington

3. No matter how the government responds during the next decade, there will be a clear need for hard decisions and the setting of priorities as we deal with the awesome problems of this month, this year and the year after that.

Restoring the research capacity, vibrancy and optimism of the late 1960s would require a doubling of the current budget for academic research ($10 billion) plus at least one decade of real growth at the level of 8% to 10% per year.

Obviously, such a proposal, made in the face of the budget deficit, the savings and loan crisis, the gulf war and a recession, has prospects akin to the famous snowball in you know where. Intermediate situations are negotiable.

4. However, if one steps far away from the traditional Washington viewpoint to see the entire tapestry, one sees a nation with a $5 trillion gross national product and a $1.3 trillion federal budget. One sees a nation that can double the defense budget (to $300 billion); spend $100 billion, $200 billion, $300 billion — whatever it takes — to handle the savings and loan fiasco; and was willing to spend $1 billion per day, if necessary, to win the Persian Gulf war.

I cite these activities only to demonstrate that this nation can do *anything* that it is convinced must be done for its general well-being.

A study of recent history (the past 50 to 60 years) indicates that, as an investment, science pays. It is the only activity that can produce returns of 10-to-1, 1,000-to-1 or 10^{A}-to-1, as both the transistor and laser have demonstrated.

Science continues to be the best single way that we can provide the jobs and national wealth we must have in decades to come. It is the one frontier left to us: the frontier of the mind. The problem is that the benefits require a long-term perspective in a nation increasingly obsessed with short-term prospects.

The good news is that there is, within both branches of government, a strong commitment to science and a determination to do the best that can be done. The president's 1992 budget request to Congress illustrates this.

The scientifically literate community represented by *Computerworld* can help by reaching out to the general public, by making the case in thousands of places and hundreds of voices.

The AAAS is an organization uniquely suited to assist in this effort. We have proposed forming a commission that would have the following charge:

- Look at ways to improve the efficiency and strategic planning of research activities.
- Study the contentious issue of the balance between major facilities and individual scientific investigators.
- Suggest mechanisms whereby the products of research can be better connected to economic utility. The academic community must learn to interface more gracefully with such issues as technology transfers, patents, marketing, tax laws and so on.
- Investigate innovative ways of funding research; for example, establishing a trust fund based on special taxes earned on high-technology products or a trust corporation that might encourage the investment community to support academic research via special "research bonds."

The issue is not the unhappiness of the scientist; the issue is the health of science and its role in the future vitality of the nation.

To ensure these things — and because we face ecological/energy problems of ferocious difficulty —, we must do what it takes to restore the exuberance and leadership of American science.

Lederman, president of the American Association for the Advancement of Science, was awarded a Nobel Prize in physics in 1988. He teaches physics at the University of Chicago and serves as science adviser to the governor of Illinois.

The truth about data

JAMES A. AUTRY

Here are two big lies of the technological age. Lie No. 1: Computers and computerized information sytems save on paperwork. Truth: They create paperwork. Lie No. 2: Computer-generated data makes decision-making easier. Truth: Data has very little to do with decision-making. (I refuse to use the word data as a plural noun.)

I once heard a very smart businessman say that, sooner or later, all business decisions get down to what your instincts tell you to do.

Another way to think of instincts is as wisdom, the accumulation of what we have learned, consciously and subconsciously, all of our lives — and if you believe the mystics, even before.

In the quest for "better information," we as managers have become almost enslaved by data processing and the ensuing endless analyses.

Computers have their place. My business would have great difficulty without them, but I refuse to sign on to the widespread statement: "Our business couldn't survive without them."

One of the managers I respect most has a question he asks when someone says something is impossible.

"Impossible, or merely inconvenient?" he asks.

Our business would be terribly inconvenienced without computers, but we couldn't *survive* without people who can make decisions based on their instincts. Computers can't make decisions based on anything. The weakest excuse in business today is, "According to the data, it should have worked."

I have a little litany I say whenever someone tries to blame it on the computer:

Data is not *facts*.
Facts are not information.
Information is not knowledge.
Knowledge is not truth.
Truth is not wisdom.

Any decision you make based on what is revealed by data and information is a decision that can be delegated.

Any decision requiring data and information plus knowledge is a decision you can train other knowledgeable people to make.

But it is in the realm of truth and wisdom that most critical decisions are made. And those are the ones that can only come from you after you have weighed all the data and information, applied your knowledge and then reached down deep into your gut, your instincts, your wisdom.

Understand that your ability to do this is your true value as an executive/manager/leader, a value not likely to be superceded by technology.

Autry is president of the magazine group at the Meredith Corp. This article is excerpted from his book, *Love and Profit*. Copyright (c) 1991 by James A. Autry. Reprinted with permission of William Morrow & Co.

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COMMENTARY

Jean S. Bozman

Shifting psychology

The recent upheavals in the independent relational database management system industry have given DEC some much-needed daylight in its efforts to increase market share for its RDB relational database.

DEC, by rights, should have had the lead in its own VAX marketplace, but RDB was not known as a high-speed performer, and it was limited to running under VMS. That gave plenty of maneuvering room to Oracle and to the former Ingres, both of which grabbed more than 20% of the VAX RDBMS market in recent years.

Events conspired last fall to weaken user perception of these two RDB rivals: Oracle's Version 6.0 and Ask Computer's Ingres. Oracle began to stumble financially, turning in a first-ever quarterly loss. Ingres was acquired by Ask at roughly the same time, making some users wonder whether Ingres was a safe choice for database software anymore.

So, armed with a new and improved version, RDB 4.0, and the offer of a free runtime version of RDB, DEC's sales force launched a drive against the independent software competitors in late 1990.

The battle for the minds and hearts of VAX users is not over, but so far in the campaign, there are some signs that it's creating a shift in user psychology.

Continued on page 32

Users improvise on IMS, DB2 coexistence

ANALYSIS

BY ROSEMARY HAMILTON
CW STAFF

IBM is scheduled to release a guide for IMS and DB2 coexistence and migration soon, said Russ Donovan, an IBM database market support manager, in a recent interview.

However, this guide may be a little late for some users. For them, managing an IMS and DB2 environment is not a new problem, and they have relied on their own methods of coping for some time.

Users have taken a variety of approaches depending on which database is currently more critical to their operation and how soon they want to migrate over to DB2. There also appears to be no set formula to manage an IMS and DB2 shop but rather a mixed bag of techniques, consisting of user-developed methods, IBM tools and third-party products.

"There is no one solution," said Howard Fosdick, president of Fosdick Consulting, Inc. "Everyone's situation is a little different in terms of what they want."

IBM plans to release its guide in the second quarter, Donovan said. The requirement came about last year when IBM issued similar guides to help people migrate from both VSAM and non-IBM database management systems to DB2. "We kept getting requests for IMS," Donovan said. "There are a lot more issues here in a coexistence mode."

Donovan said the guide will address conversion and test issues as well as documentation on "tools and strategies from moving the database across."

In the meantime, some users have their own plans in mind. For example, Banc One Services Corp. maintains a clear dividing line between IMS and DB2 applications. Actual data is less clearly segregated, and the bank has implemented techniques to extract IMS data for DB2 users as needed, said Terry Lowder, vice president at Banc One.

IMS/DB2

Banc One Services

Clean separation between IMS and DB2 along application lines. IMS handles production, DB2 assigns administrative query jobs. Ability to extract IMS data and deliver to DB2 users

Mellon Bank

Maintain existing IMS environment, while DB2 handles all new mission-critical applications

CSX Technology

Two-pronged approach of selective migration of IMS data to DB2, while also assigning some application development to the newer database management system

CW Chart: Doreen St. John

IMS still popular choice

The older, hierarchical IMS has long been the workhorse and continues to handle critical production work, while the relational DB2 handles administrative-type applications, according to Lowder.

Working with Electronic Data Systems Corp., the bank developed a utility that serves as a layer between the databases. It can handle either SQL or DL/1 calls and assists when a DB2 application may need IMS data. The application talks to the utility, called Database I/O, which then retrieves the data.

"Our approach is to designate as of today that relational is for ad hoc and IMS is production," Lowder said. "We don't allow users to access production [data]

Continued on page 32

Another optical choice for DEC's VAX users

BY MARYFRAN JOHNSON
CW STAFF

MILPITAS, Calif. — System Industries recently introduced its first optical product for Digital Equipment Corp. computers with the Laser's Edge optical jukebox, providing yet another option for storage-hungry DEC users.

The mass storage device provides 30G bytes of on-line storage and connects to DEC's Standard Disk Interconnect controllers, including the hierarchical storage controller used with most VAX and Vaxcluster systems.

"This is a good opportunity for System Industries because DEC has been very slow to support optical," said Crawford Del Prete, an analyst at International Data Corp. in Framingham, Mass. "DEC does provide optical disc through OEM agreements, but optical continues to be an emerging market for mid-range systems."

Targeted at imaging and other "mass capacity" applications, the System Industries jukebox incorporates read/write disc drives that provide access to stored data through a Standard Disk Interconnect port.

Perfect fit

The jukebox fit well in a heterogeneous environment of DEC VAXs and Unix machines in the neuroimaging laboratory at the University of California at Los Angeles' School of Medicine.

"Among the things we do here is brain imaging, so we have huge data sets we collect and use heavily for a time," said Arthur W. Toga, the laboratory's director. "Then we need to archive them, so the removable aspect of optical cartridges was very attractive."

The jukebox not only serves Vaxcluster users but is also linked over the Network File System to 10 Unix workstations, including an IBM RISC System/6000, Decstation 5000s and machines from Hewlett-Packard Co.'s Apollo Division and Stardent Computer, Inc.

The larger Model LE56, priced at $92,000, holds up to 56 optical discs and contains a high-speed disc changer and removable disc packs. The Model LE32 holds up to 32 optical discs and costs $86,135.

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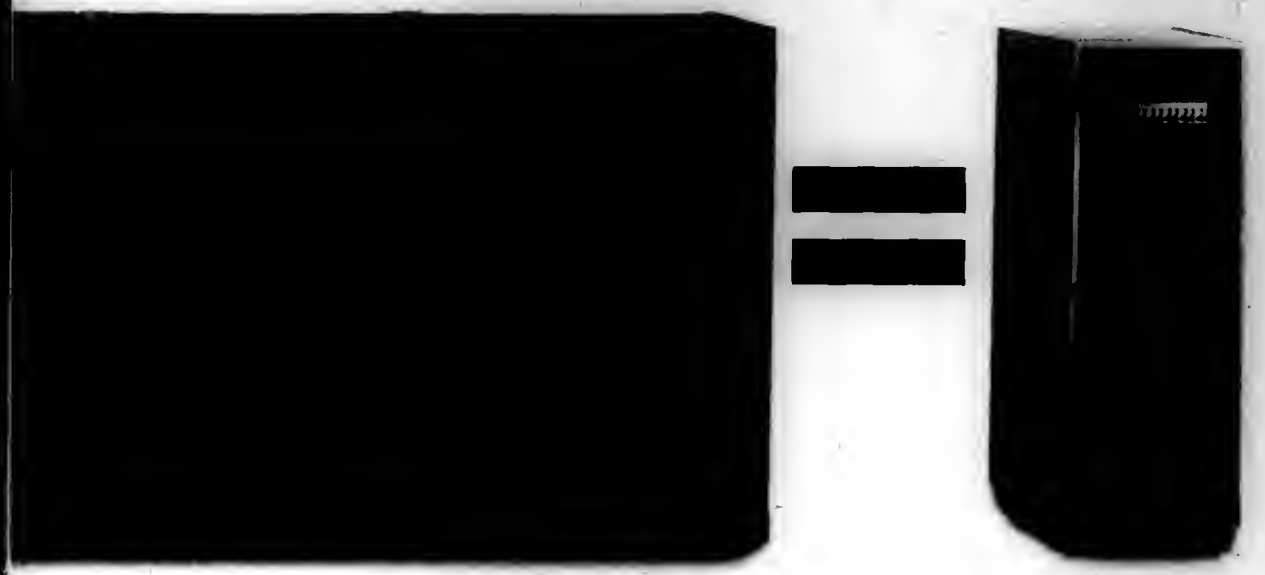

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Apr 2	Louisville	May 8	Los Angeles	Jun 11	Nashville
Apr 9	Salt Lake City		St. Louis	Jun 13	Ottawa
Apr 10	Oak Brook	May 9	Phoenix	Jun 14	New York
Apr 11	Chicago	May 10	Richmond		Toronto
	Portland	May 15	Grand Rapids	Jun 17	Winnipeg
Apr 16	New York		Orange Co. (CA)	Jun 18	Regina
Apr 23	Little Rock	May 16	Columbus	Jun 19	Calgary
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Northwest productivity takes off with imaging

Airline gets data out faster, with smaller staff

ON SITE

BY ELLIS BOOKER
CW STAFF

MINNEAPOLIS — To be successful, a document imaging application must do more than store paper records in electronic form. It must change the quantity and caliber of the data available to a business, altering the way people and processes work.

Northwest Airlines is a prime example of an imaging user that planned for this change and is now reaping the benefits. One year ago, Northwest — the nation's fourth-largest carrier — began deploying a massive, 450-user imaging system to capture and process the ticket stubs printed by Northwest gate agents and independent travel agents and carried by Northwest passengers [CW, April 16, 1990].

"We can now do everything on a timely basis, with a slightly smaller staff and a larger airline," said Scott Grengs, project analyst of distributed services and one of the people closest to the passenger revenue accounting (PRA) system.

On-time processing

Although Northwest has not yet tallied the hard dollar savings that have accrued from the imaging system, Grengs said, one notable benefit has been to bring the processing load up to date. "When I started here four years ago," Grengs said, "we were, at times, as much as six months behind [in processing the ticket stubs]." Today, the system produces revenue or audit reports "accurately and on time," Grengs said.

Under the 20-year-old manual system, the revenue and marketing departments could only extrapolate their numbers, manually conducting a 5% audit of all the tickets. The problem was the volume of these ticket coupons: In peak months, Northwest processes 270,000 daily.

The 5% audit, while adequate for billing and revenue projections, fell far short of the needs of Northwest's marketing department, which wanted more timely and detailed information to monitor the effectiveness of its marketing campaigns.

"Marketing needs to know a lot more about what's happening, where and when people fly and which products they're using," said Mike Shields, project manager of the marketing analysis system at Northwest's Information Services Group.

"Now we capture 100%," said Shields, adding that several benefits have flowed from this change. For example, Northwest can now accurately monitor the fares and commissions charged by independent travel agents. An even greater value, he said, will be a not-yet-operational subsystem to track incentive and promotional programs.

Northwest Airlines' imaging system can handle 270,000 ticket coupons daily

For example, this will let Northwest monitor, for the first time, the effectiveness of short-term flight discounts or promotional tie-ins with hotel chains.

Shields emphasized that the data coming from the PRA system is being integrated with other sources, such as Northwest's flight schedules. "We're working now on bringing these data sources together so that they can be accessed by marketing and applications development," Shields said.

Shields said mainframe-based DB2 databases will continue to handle the marketing department's needs for the foreseeable future. "But as we move down road," he added, "we may look at distributed databases and taking more advantage of intelligent workstations."

Late last year, Northwest, which employed Chicago-based Andersen Consulting as the systems integrator on the project, added the last 100 users to its PRA system.

The 442 users, working on Sun Microsystems, Inc. SLC diskless workstations, are connected over a Sun local-area network, which is attached to a Filenet Corp. image server and image library. The libraries contain as many as 408 optical discs for a total on-line capacity of 40 million documents.

SIG pilots 'developers' environment'

Shearson spin-off puts together development, maintenance tool kit

BY JOHANNA AMBROSIO
CW STAFF

Securities Information Group (SIG) is addressing the "shoemaker's children" syndrome by providing its developers with a set of integrated tools for maintenance and new development.

Included in the tool kit are off-the-shelf packages for computer-aided software engineering (CASE) and reverse engineering, said Ira Morrow, vice president at SIG. The move is especially timely, he said, in light of SIG's recent spin-off from Shearson Lehman Hutton, Inc. Formerly Shearson's information systems unit, SIG is now owned and operated by American Express Co., Shearson's corporate parent, although Shearson remains SIG's only client to date [CW, Feb. 4].

"One of our major focuses this year will be on reverse engineering — to abstract an existing system to a high-level design and then forward engineer that," Morrow said. "With the spin-off, this is increasingly important so we can take what we develop and generalize it for the entire industry, not just for Shearson."

Because SIG will be targeting different clients with various technical needs, "there is a far greater need to do this kind of tailoring," Morrow said. "So there's increased motivation to get it in place."

Beta-testing Crysallis

This month, SIG will begin beta-testing Language Technology, Inc.'s Crysallis reverse-engineering package. If all goes well, Crysallis will be linked into the existing tool kit, which includes Knowledgeware, Inc.'s Information Engineering Workbench, Cadre Technologies, Inc.'s Teamwork and Bachman Information Systems, Inc.'s Data Analyst.

"Like the majority of shops, most of our resources are spent on modifying existing applications. It takes up a disproportionate amount of our time," Morrow said. "So about 1½ years ago, we sat down to modify how we do this. We brought in CASE tools and developed an integrated workbench."

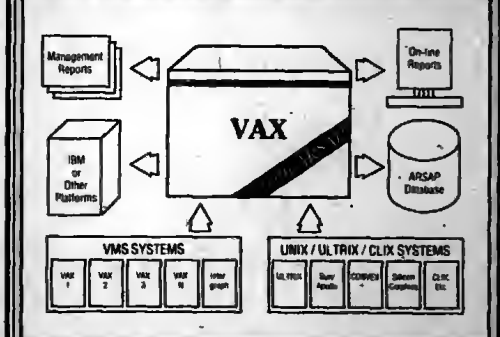
Just as Shearson did back then, SIG will do more than just bring in the new tools and expect programmers to use them. "We have an internal support group for marketing and training on these tools," including "Tool Days" when vendors make technical and marketing presentation, Morrow said. "If people aren't using something, you have to ask why. Maybe they need more training, or maybe there's a problem using a particular tool in their environment."

> INCLUDED IN the tool kit are off-the-shelf packages for computer-aided software engineering.

Morrow's group in SIG supports four Shearson programming units: trading, branch office/retail, operations and corporate systems. "They all have different needs. Corporate needs Cobol and DB2 on the mainframe, trading is mostly C and Unix on workstations, and retail is mostly PS/2 and OS/2 under Windows," he said.

Right now, the focus is on "proving the concept" of a developer's environment with its integrated tools. "Once we prove that we can tangibly measure an improvement — decreased time and cost and increased productivity — we'll select an actual architecture," Morrow said. "It helps that you no longer need to develop on the platform you're targeting for. You can use Unix boxes with X terminals even if your target is PS/2s or the mainframe. That gives me a lot of options."

What SIG is aiming for, he said, is "trying to make a real cycle out of AD/Cycle — to go forward, reverse or loop around. The biggest part of AD/Cycle is in maintenance and testing, but everyone's been concentrating on the front-end pieces. We're shifting our emphasis to back-end CASE."



ARSAP: Professional System Accounting Software for VAX/VMS and UNIX Systems

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For further information, call: 1-800-432-7727 or (301) 725-2500

GEJAC, Inc.
8643 Cherry Lane
Laurel, MD 20707

Index data collected on-line

ON SITE

BY SALLY COSACK
CW STAFF

WASHINGTON, D.C. — One measure of the U.S. economy, the Consumer Price Index, has been churning out numbers on a regular basis since 1913, and to no one's surprise, the most consistent and stable numbers these days are found in relation to total amount of money spent on gasoline.

"More Americans buy gasoline than any other category we follow," observed Stephen G. Wright, chief of the Consumer Prices and Consumption Studies Division at the U.S. Bureau of Labor Statistics. "It's something that is hard to cut back on and almost impossible to do without."

Wright and his staff are responsible for developing and running all of the systems that produce the monthly index. For data collection, tabulation, formatting and transfer, the department uses programs created with the SAS Application System, an application development system from SAS Institute, Inc.

"We send out pricing forms to collect approximately 85,000 price quotes in 16,000 different retail outlets each month and also gather information on rental and home ownership costs nationwide," Wright said.

The completed forms, which are customized from previously compiled pricing information, are mailed back to Washington, where preliminary calculations are made to assist economists in reviewing the data.

The SAS Application System is used to retrieve the selected data that has been previously reported, allowing the department to customize and build the next month's price form, Wright said.

Off-site storage

Once respondent information is entered, necessary changes are uploaded to an off-site, Amdahl Corp. 3090-class mainframe. Locally, Wright's division uses more than 100 Intel Corp. 80386-based machines running MS-DOS and three Sharebase Corp. 700 database servers for compiling and producing the numbers.

The personal computers are linked to the database machines over a 3Com Corp. 3+ local-area network, and some communicate to the mainframe over 9.6K bit/sec. lines. "For our purposes, this is fast enough," Wright said. "We only send necessary changes to the mainframe."

According to Wright, the database machines are populated with bulk tapes from the Amdahl system. When uploading data, information from the database machine is put into a file transfer format that uses an SAS data set as a transaction file.

SAS Application System Version 5.18 now resides on the mainframe, as does Rapid, a database with relational properties from Statistics Canada.

The division uses several in-house software systems to produce the index, including a commodities and services system for computing price relatives from retail quotes and a housing system for compiling housing and rental data.

There is also a publication system that organizes the information into various formats for use in Lotus Development Corp. spreadsheets and even press announcements.

Most of the software systems, including printing of schedules, were written using the SAS Application System.

Old reliable

The bureau has been using SAS for over 10 years, Wright said, relying on it heavily in the early '80s when it began to build a system for a consumer survey. Wright is pleased with the software's logic and data handling abilities as well as the automated steps provided for data processing and file handling.

The software has also been used to develop an in-house interface to Rapid, which standardizes the interaction between the SAS Application System and the database management system Wright said. The department also uses the SAS macro facility to package code.

Wright added that the department is in the process of testing SAS Application System Version 6.06. "We submit everything to a lengthy and vigorous testing process before we put anything onto our production software."

Consumer Price Index

- The index is compiled monthly by the Division of Consumer Prices and Consumption Studies, which is a division of the U.S. Bureau of Labor Statistics.
- The Bureau of Labor Statistics is part of the Department of Labor.
- By definition, the index measures price change on a market basket of goods, reflecting the buying patterns of the population. It is often incorrectly referred to as the "cost of living index."
- The Bureau of Labor Statistics uses Boeing Computer Services in McLean, Va., for all mainframe computing needs. Currently, index information resides on an IBM 3090-class machine from Amdahl under MVS/XA.

Bozman

FROM PAGE 27

"Oracle's weakness has to be the price," said Ed Jakubas, information systems director at the Midwest Stock Exchange in Chicago, which is evaluating RDB as a replacement for Oracle. "Oracle has a solid product, but what is attracting us to RDB is the integration possibilities with the [VMS] operating system." The Midwest Stock Exchange has more than 24 VAX systems, including smaller Microvaxes.

Other sites that use Vaxclusters are also listening to DEC's call to re-evaluate RDB. That's because Oracle has had to re-architect a "parallel server option" that would allow multiple VAX nodes to update a single, shared copy of Oracle 6.0. Since the fall of 1989, Oracle 6.0 has not been recommended, even by Oracle, for use with Vaxclusters. A new version for Vaxclusters, Oracle 6.2, is due out this month [CW, Feb. 18].

Fear and uncertainty could be used by DEC in its marketing efforts to compare RDB with the Ingres product, but so far there is little sign that Ingres users are "going home" to DEC's bundled hardware and software.

Many users are waiting to see how the Ask/Ingres marriage works out. It's also worthy of note that Ingres provided an official DEC/Ultrix version of the Ingres DBMS, called Ultrix/SQL, for sale with VMS workstations last year.

Flexibility to run in varied software environments also gives the independents an edge. It's clear that users favor the way Oracle and Ingres run on Unix systems, something DEC's RDB cannot currently match. However, RDB can already play in "open" networks by accessing other DBMSs through "gateways" to IBM and Unix machines. In addition, industry analysts say, DEC will soon announce a version of RDB for Ultrix.

A January 1991 survey of 4,000 VAX sites by Computer Intelligence in La Jolla, Calif., found that the RDBMS market for VAX hardware shakes out this way: Oracle and RDB were each installed at 29% of the sites, while Ingres was installed at 21%. The remaining 21% of the sites employed a variety of RDBMS products, notably those from Sybase and Informix Software, which no longer markets a VAX version of its RDBMS. In other studies, Oracle and RDB scored about 22% market shares.

Will DEC's aggressive marketing push, coming years after the RDBMS independents gained footholds in the VAX market, pay off in 1992? To judge by appearances, market share won't shift radically, but shift it might. We'll just have to wait for that next VAX survey.

Bozman is *Computerworld*'s West Coast senior editor.

HARD BITS

'No' vote on minicomputer servers

Large companies are giving a big "thumbs down" to the idea of using minicomputers as servers, according to a recent report by Forrester Research, Inc. The study showed that although some large firms use minis in the server role, the majority rely on personal computers. When asked about future plans, a sample of the Fortune 1,000 said they would heavily favor PCs over minis in a server capacity.

Array Technology Corp., headquartered in Boulder, Colo., has announced an OEM agreement with NCR Corp. to supply disk array storage systems for high-end NCR computers. Under terms of the contract, Array will develop hardware and software storage systems to NCR specifications, based on redundant arrays of inexpensive disks technology.

In other NCR-related news, the Dayton, Ohio-based company has signed a preferred distribution contract with Modern Office Machines, under which the latter will resell NCR workstation products to businesses in Greenville-Spartanburg and Charleston, S.C.

Motorola, Inc. has inked a value-added reseller agreement with Datek, Inc., a software company in Concord, Mass. In its new alliance with Motorola, Datek will offer turnkey, Pick-based software to run on Motorola Computer Group's Unix-based Multipersonal Computer and Delta Series systems.

Promising to aid customers in maximizing systems productivity, Point 4 Data Corp. has begun distributing the Communicator to its 30,000 Point 4/Iris multiuser computer owners. The Communicator contains information on developments, field-installable enhancements and systems upgrade specials. Interested Point 4/Iris users can subscribe to the Communicator free of charge by contacting the company at its Tustin, Calif., headquarters.

IMS, DB2

FROM PAGE 27

for performance and integrity reasons, but we provide users with what they need from a relational database," he added.

Other users have taken different paths. Mellon Bank Corp., for example, is relying increasingly on DB2 for its critical production applications.

"We are charging full-speed ahead with DB2," said David Moore, a senior vice president at Mellon Bank.

However, that does not necessarily mean the end for IMS. Moore said there is no push to migrate his IMS environment, which contains "about three times as much data as DB2 at this point." Instead, the bank has designated all new development for "mission-critical applications" as DB2's domain.

CSX Technology, the information systems division of CSX Corp., has taken a few approaches rather than relying on one set plan, said Doug Underhill, assistant vice president of technical services.

Underhill said the company has assigned some new development to DB2 and has attempted some IMS data migration to the relational environment. The ultimate requirement, he said, is to have one database — DB2. CSX converted a few systems to DB2 recently, an effort that Underhill described as "pretty easy."

"I mean, we aren't rocket scientists. It's the same data — it's just a different structure," he said.

NEW PRODUCTS — SOFTWARE

Applications packages

Group 1 Software, Inc. has announced two software packages designed to assist users in coding and presorting mail in order to accelerate delivery and minimize the amount of undeliverables.

Code-1 ($42,000) was designed to add nine- or five-digit ZIP codes, carrier route codes and postal bar codes to address lists.

Mailstream Plus ($16,500) can be used to presort mail so maximum postal discounts are ensured for first-, second- and third-class mail.

A package that includes both products is priced at $49,500.

Group 1 Software
Washington Capital Office Park
6404 Ivy Lane
Greenbelt, Md. 20770
(301) 982-2000

Marcam Corp. has announced Prism Quality Management, a Prism-based module that automates the testing and sampling of raw materials and in-process or finished goods.

Prism is a business planning, control and cost accounting software system designed for the process manufacturing industry. The Quality Management version can also be used to control graded inventories or material being inspected or held because of defects, the vendor said.

The product is scheduled to begin shipping in July. Pricing begins at $18,000.

Marcam
95 Wells Ave.
Newton, Mass. 02159
(617) 965-0220

NEW PRODUCTS — HARDWARE

Processors

Altos Computer Systems has announced two open architecture, multiuser computers that feature an Intel Corp. I486 processor and an Extended Industry Standard Architecture bus.

The Model 5820 and the Altos Power Server Model 5000-33 — part of the company's System 5000 family — feature a proprietary operating system, the Altos Unix System V/386 for the 486 Release 2.0, which is based on The Santa Cruz Operation's Unix Version 3.2.2.

Pricing for the Model 5820 and Altos Power Server Model 5000-33 begins at $14,300 and $28,600, respectively.

Altos Computer Systems
2641 Orchard Pkwy.
San Jose, Calif. 95134
(408) 946-6700

Texas Instruments, Inc. has announced a Motorola, Inc. 68040-based computer designed to support up to 64 users.

Model 1507 of the company's 1500 computer family runs under TI System V Version 3.2, TI's version of the Unix operating system. The complex instruction set computing-based device can be configured with 4M or 16M bytes of memory and features 260M bytes of mass storage.

A basic configuration lists at $18,000.

Texas Instruments Information Technology Group
P.O. Box 202230
Austin, Texas 78720
(512) 250-7111

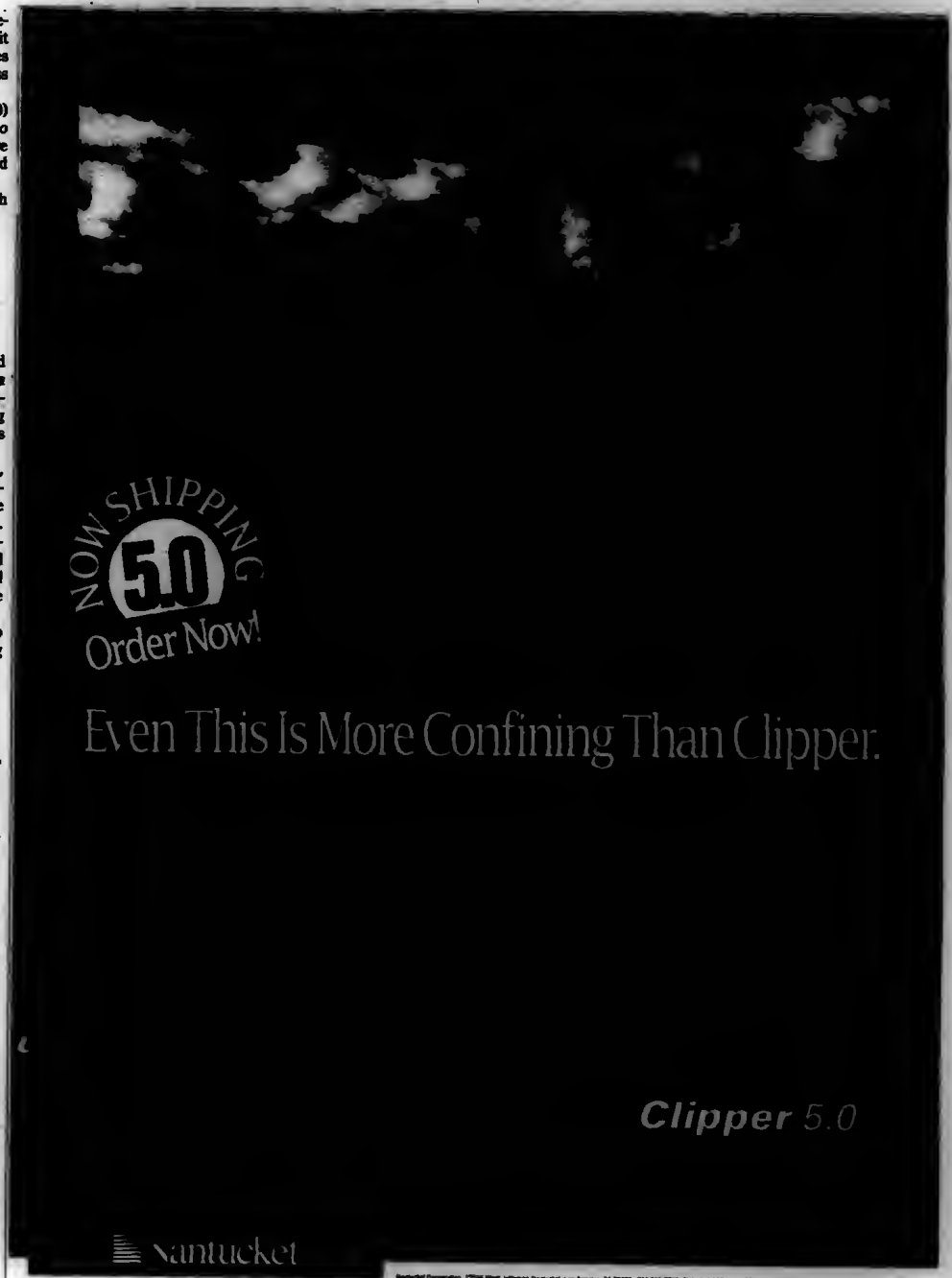
I/O devices

Industrial Electronic Engineers, Inc. has announced an interactive touch-screen terminal based on flat-panel technology.

Model 4286 of the company's PEP family of touch-screen terminals features a 256- by 128-dot display panel. The product's cathode coating allows the display to be visible in high ambient light conditions; the coating also permits the terminal to operate in temperatures ranging from -20 to 75 degrees C.

The unit is priced at $1,619.

Industrial Electronic Engineers
7740 Lemona Ave.
Van Nuys, Calif. 91409
(818) 787-0311



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PC MAGAZINE EDITORS' CHOICE November 27, 1990

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C&C Computers and Communications

NEC

Intel 386 tops buy lists

Study finds standardization among PC users

BY PATRICIA KEEFE
CW STAFF

Few will be surprised that a recent survey of personal computer purchase plans revealed that Intel Corp. 80386-based computers predominate.

Computer Intelligence's study focused on major metropolitan areas, where 61% of the respondents underscored the desktop statement of direction issued by many corporate microcomputer managers during the past year: standardization on the 386 family.

The twist comes from the fact that despite Intel's best efforts to persuade the populace otherwise, 8088- and 8086-based computers continue to find favor. Almost as many users — just over 6% — plan to buy these low-end Intel-based boxes as plan to buy Motorola, Inc. 68000-based computers, which is just over 9%, according to Computer Intelligence.

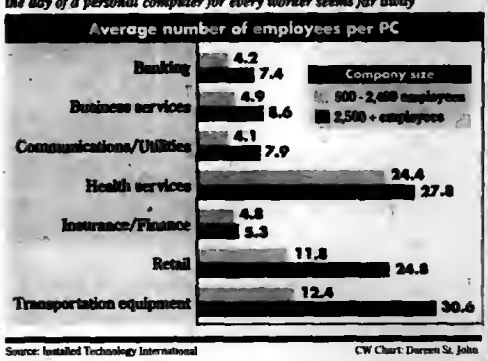
A solid 22% said they will bolster their installed bases of 80286-based computers. Conversely, the very high end barely elicits a yawn; only 1% of the respondents overall — 2% in Minneapolis — said they will buy 1486-based systems.

This breakdown jibes with a survey of The Sierra Group, Inc./First Boston Corp. MIS Executive Council, which takes a more specific look at what will be bought while noting that fewer systems overall will be purchased in 1991. Compared with 1990's growth in PC spending, which was 47.6%, the report

Continued on page 40

Open market

Even in the most computer-intensive industry sectors such as insurance, the day of a personal computer for every worker seems far away



Source: Installed Technology International

CW Chart: Darren St. John

Compaq misses low-price mark

ANALYSIS

BY RICHARD PASTORE
CW STAFF

Compaq Computer Corp.'s first shot at low-end, budget-priced desktop computing seems to have gone slightly awry. Observers said Compaq's Deskpro 286N and 386N systems are as mechanically surefire as their higher end brethren, but pricing and marketing are off-target.

The 286N and 386N were introduced 10 months ago as Compaq's first network node machine and its new entry point stand-alone workstation. The Intel Corp. 80286 and 80386SX boxes could be configured with no disk drives or with a hard disk and/or floppy disk drive. They were designed with a smaller footprint, less expandability and more network security features than other Compaq desktops.

With its N systems, Compaq was hoping to slow customer erosion to the low-priced clones in the node and stand-alone markets. However, pricing and marketing problems have kept that goal elusive, analysts agreed.

"Everybody's full-blown 386SX machines are well below Compaq's price points on the N products," said Jim Poyner, market analyst at William K. Woodruff & Co. in Dallas.

"This is a tough environment right now. Compaq and IBM have the same problem: They're priced higher than everybody else," said Robert Goldberg, vice president at Old Stone Bank in Warwick, R.I. He is buying AST Research, Inc.'s Bravo personal computers for "considerably less" than the N's prices.

Even Compaq customers voiced concern about price. "Everybody who buys Compaq is willing to pay more" for the value perceived behind the brand name, said Marc Kustoff, director of microcomputing at Rhone Poulenc Rorer, Inc. in Fort Washington, Pa. The question is, how much more? "If the product's going to be successful, it's not cheap enough," he said.

Another problem confusing potential users is Compaq's unfocused N product positioning. At first, the models were slotted primarily as network nodes rather than as stand-alone systems.

"We did it to ourselves with the naming," said Lorie Strong, Compaq's vice president of product marketing. The "N" was most often translated as "node." She said the machines are now doing equally well as nodes and low-end workstations.

"Now, they're trying to get the best of both worlds and have it straddle two markets," Kustoff said. But as a node, it comes up short on size and price, and as a workstation, it lacks standard memory, speed and disk drive flexibility, he noted. Kustoff buys Compaq's 386S/20 as his stand-alone standard.

Less expensive than most Compaq systems, *the N models still cost more than competing computers while not including features such as Microsoft Corp.'s Windows or a monitor*

Despite the marketing confusion and pricing concerns, one thing seems clear: Compaq did not compromise on quality with the N products. Users said that despite their low prices relative to other Compaq products, the machines are just as sound.

At New York accounting firm Buchbinder Tunick & Co., the $2,000 N stations perform as solidly as the $30,000 Compaq Systempro server, partner Mitchell Weiss said.

Amoco Transport Co. chose the 286N for its durability. The shipboard machines have stood up well to weather conditions that pitch Amoco's ships as much as 45 degrees, said Walter Kristiansen, manager of operations, coordination and support.

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- *Writing Portable Applications*

These are just a few of the 50+ technical sessions scheduled for this year's Conference. But the Micro Focus Users Conference is more than three days of seminars; it's a unique opportunity for developers to meet the Micro Focus technical and support staffs and share solutions with other users through the Conference's Special Interest Groups.

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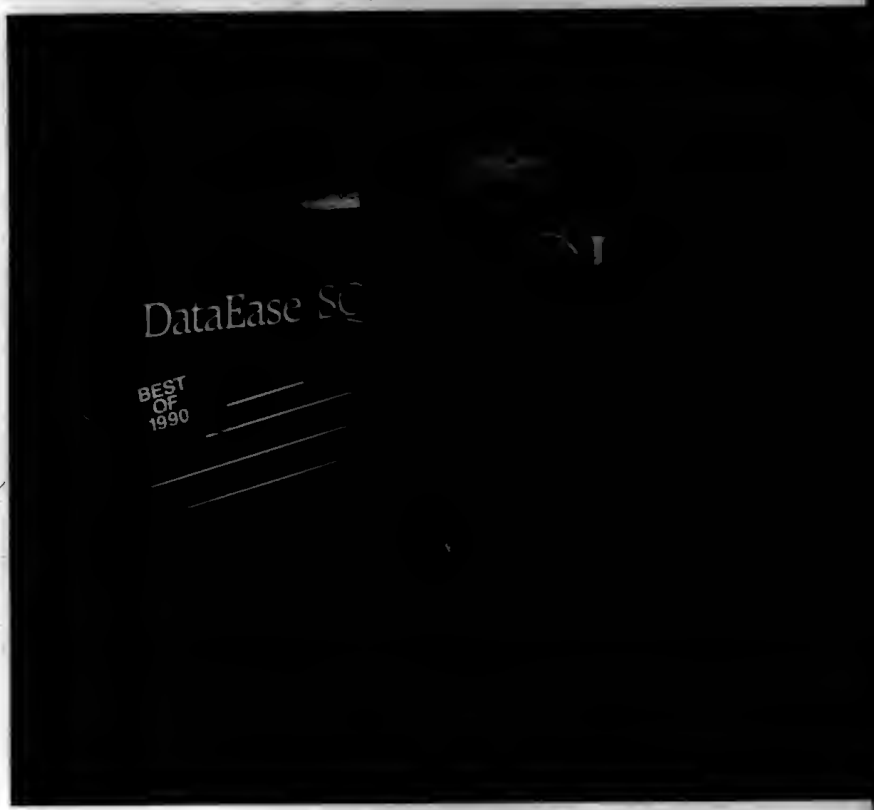

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Sign maker glitters with IS gear

ON SITE

BY CAROL HILDEBRAND
CW STAFF

If you have ever watched the ball drop in Times Square on New Year's Eve, you have seen Artkraft Strauss Sign Corp. at work. What is a little harder to see is how the company has used technology to redesign its business.

The family-owned company, in business since 1897, is one of the premier makers of large-scale outdoor advertising, employing almost 200 people. Times Square is Artkraft Strauss' private fiefdom in terms of sign-building, and it has been since the 1920s.

The firm has also left its mark on the Great White Way: Company founder Jacob Starr was known as the "lamplighter of Broadway." Starr managed his company by using the latest innovations. He was recognized in his field as being the first to use neon in outdoor advertising.

Behind the times

When his son Mel took over the firm, the emphasis on new technology lessened because Mel's interests laid more in the art of deal-making. By the time Mel's children, Jonathan and Tama, took over in 1988, Artkraft Strauss had fallen behind in technology. Computers played little role in the company.

"There was one IBM AT in the place, covered with dust, that everybody was scared of touching," said Jonathan Starr, company chairman. "Now, there probably isn't a desk in the place that doesn't have some kind of a system." Uses range from accounting to project cost estimating and computer-aided design and manufacturing (CAD/CAM).

Starr said a look at the rest of the market provided an impetus to jump in. "It was either do it or fade away," he said.

The first area that was targeted was estimating job costs. Starr wrote a Lotus Development Corp. 1-2-3 template that let his estimators plug in such factors as labor hours for painters and sign hangers and costs for aluminum and light bulbs. "It was rudimentary, but it was a start," he said.

Another process in need of automation was the method of controlling some of the big signs. For example, there is a supermarket sign in Brooklyn advertising specials that change several times per day. "We used to send someone up into the sign's control room to make programming changes. Now, we have telephone lines to the sign. We'll change the programming of the sign in-house and send it via modem."

The biggest target area was in the design and manufacturing area, however. Starr pulled his design people off a manual process and started them with Autodesk, Inc.'s Autocad CAD/CAM software on an NEC Technologies, Inc. personal computer based on the Intel Corp. 80386.

Times Square has been home to many of Artkraft Strauss' signs

At the same time it jumped into CAD, the company invested several hundred thousand dollars in an integrated manufacturing package from Cybermation, Inc. in Medford, Mass. The package comprises three pieces: front-end software, cutting machinery and a number of subpackages specifically for sign designing. The package runs on an Intel 80386-based PC. For example, one program runs a process known as nesting, which computes the most efficient placement of letters that need to be cut from a sheet of aluminum.

Starr said he generally has approximately three people using The Santa Cruz Operation's Xenix-based manufacturing system. "People can be designing at the same time that others can be independently downloading files or cutting [letters]," he said.

Automation has led to a considerable improvement in manufacturing precision.

"Before, we would take a drawing and put it on an opaque projector with all the distortion, blow it up on the wall, and a guy would stand by the wall with a pencil and draw," he said, referring to how the company enlarged designs. "Now, we can take something tiny, make it any size and still be within a couple thousandths of an inch."

The cost savings are evident throughout the company. For example, an architectural change of one inch to a marquee design can mean the recalculation and redrawing of the entire set of blueprints, perhaps as many as 20 sheets' worth. "It would take someone weeks to redraw 20 sheets," Starr said. "Now, it's a very simple function of the plotter."

Panther tape line released

BY MAURA J. HARRINGTON
CW STAFF

WESTLAKE VILLAGE, Calif. — Tandberg Data, Inc. last week introduced its first line of tape backup subsystems to be marketed under the company name.

Designed for use on stand-alone personal computers and local-area networks, the Panther series includes ¼-in. tape backup subsystems ranging from 60M bytes to 525M bytes available in both external and internal models, according to Tandberg.

The products come bundled with software that provides connectivity to several platforms. Depending on the subsystem configuration, Tandberg supports DOS, OS/2, Unix/Xenix, Pick Systems' Pick, Novell, Inc.'s Netware and Microsoft Corp.'s LAN Manager platforms, among others.

Prior to the Panther series, Tandberg acted as an OEM to IBM, Digital Equipment Corp. and other companies by selling its high-end products for installation in midrange and mainframe systems.

Available now, the Panther series products range in price from $995 for a 60M-byte internal subsystem to $1,699 for a 525M-byte external subsystem, a spokesman said, adding that a 1G-byte Panther product is due out within four or five months.

Windows interface unveiled

BY JAMES DALY
CW STAFF

MOUNTAIN VIEW, Calif. — Parcplace Systems recently introduced an object-oriented programming environment for Microsoft Corp.'s Windows 3.0 that could go a long way toward streamlining the duties of Windows programmers.

Object-oriented programming involves creating a library of reusable data structures and procedures, thus allowing the software engineer to rapidly create prototypes and produce programs. The methodology is considered key in the development of graphical user interfaces, distributed applications and links to databases.

Objectworks/Smalltalk Release 4.0 lets developers call as many as 350 types of portable "objects," or the things that are manipulated in the program, and more than 7,400 "methods," which are the paths those objects travel, according to Parcplace officials.

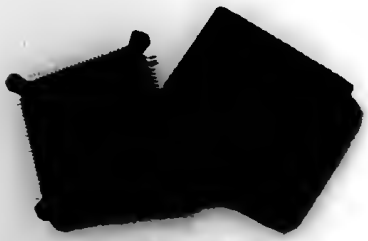
The update, which is geared toward the corporate in-house applications developer, is also the first development environment to exploit the 32-bit linear mode of Windows 3.0, company officials said. Most Windows 3.0 applications are written for 16-bit segmented mode, which grinds down application performance because it requires breaking programs into 64K-byte parts. By contrast, 32-bit linear mode allows developers to ignore the 64K-byte chunks and write applications with no memory segment limitations.

Overcoming the 64K-byte segment requirement eliminates a major performance bottleneck and allows programmers to run code as much as 50% faster than before, said Doug Pollack, vice president of marketing.

The performance of Windows applications is further enhanced with Objectworks/Smalltalk because it is a fully compiled system. Using a technology called dynamic compilation, Objectworks/Smalltalk executes native machine code and, unlike traditional compilers, handles the last stage of compilation at runtime.

Objectworks/Smalltalk Release 4.0 is priced at $3,500 and is scheduled to be available this month.

Compaq presents PCs for people with basic needs. (But not-so-basic wants.)



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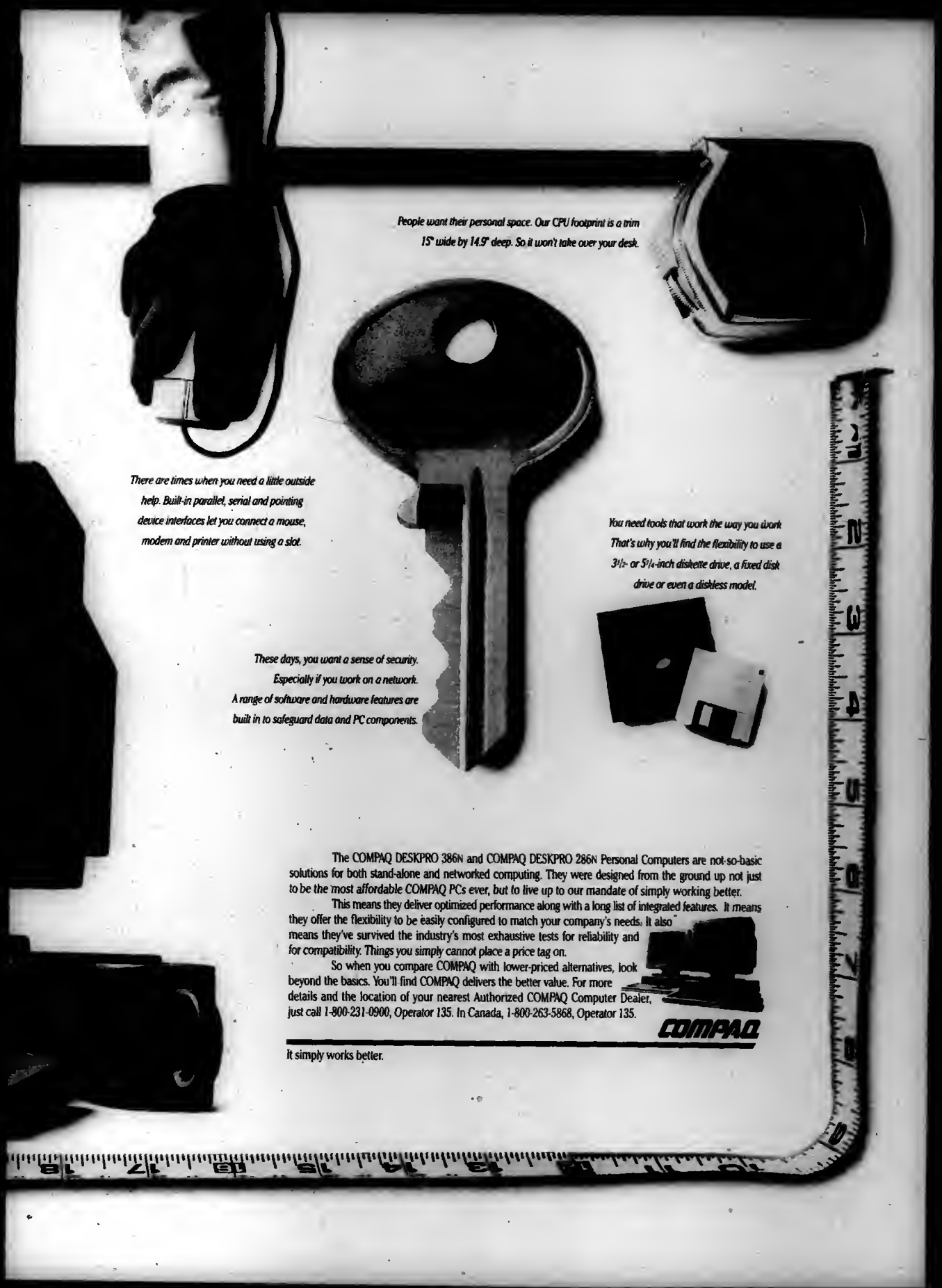

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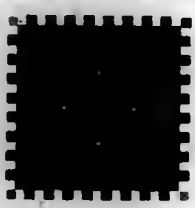
Multiprocessors promise speed

ANALYSIS

BY J. A. SAVAGE
CW STAFF

As if a 50 million instruction per second (MIPS) processor is not fast enough, workstation vendors are lashing those processors together to create faster computers.

Most vendors of reduced instruction set computing (RISC) workstations are opting for "tightly coupled" or "symmetric" multiprocessing. Others, namely IBM, are aiming, at least in the near future, for "loosely coupled" multiprocessing.



Mainframe vendors have used tightly coupled multiprocessing for their massive systems since 1973 with IBM's dual-processor System/370 Model 168. But those are large and proprietary CPUs, and it took almost two decades for mainframe vendors to hook eight processors together.

For the same reason that mainframe vendors use multiprocessing — speed and throughput — workstation vendors are beginning to tightly couple CPUs. So far, those systems are used as servers. For desktop machines, vendors are relying on increasing the capacity of uniprocessors, but multiprocessing can be done through links between several desktop machines, ending up as loosely coupled multiprocessing.

Tightly coupled multiprocessing uses a single, shared memory and one copy of the operating system. Each processor can address the same peripherals. "It's like four workmen in the same room doing the same task," said Rajeev Jog, performance analyst for hardware systems at Hewlett-Packard Co.

While vendors who use other companies' RISC architecture — such as that from Mips Computer Systems, Inc. and Sun Microsystems, Inc. — are able to engineer multiprocessing systems, those architectures have yet to inherently support multiprocessing. However, Mips and Sun have said their RISC architecture will support symmetric multiprocessing in the future.

Loosely coupled multiprocessing uses available processing power in disparate computers to process tasks. Each CPU has its own memory and its own copy of the operating system. The user pays a performance penalty for its use. For instance, the system has to find which peripheral to use for which task. When it is finished crunching data, the data has to be synchronized on the original CPU.

"It's like you have workmen in four different rooms with the same equipment in each room, but they're running back and forth to communicate the job," Jog said.

IBM has said it will eventually implement symmetric multiprocessing, but for now, it is headed for loosely coupled technology in an attempt to leverage its installed base of networked uniprocessors. "Basically, the MIPS are free," said Phil Hester, director of IBM's engineering center, Advanced Workstations Division, in Austin, Texas. "The assumption is that people in an organization will have their own workstations. Throughout the day, there's a large amount of MIPS idle in those workstations. Loosely coupled multiprocessing can recycle or reuse those MIPS that would otherwise be wasted. You can run large jobs at only an incremental cost."

IBM is following this loosely coupled multiprocessor technology in its personal computer environment [CW, Feb. 25].

The other side of the coin

Both multiprocessing methods have their drawbacks. To avoid CPU tasks bashing into one another on the way to memory, vendors must increase bandwidth. "A VME bus just doesn't have the throughput," said Allan Snell, vice president of marketing at Solbourne Computer, Inc. in Longmont, Colo., which makes multiprocessor servers based on Sun's CPUs. "That's the weak link. You can put together a few CPUs now, but to expand, you need one big, wide, fast bus."

In loosely coupled multiprocessing, the drawback is the software overhead to coordinate and synchronize data. In homogeneous environments, that takes some overhead, Hester noted, but in heterogeneous environments, "there will certainly be problems trying to get it to work," he added.

As RISC processors become faster and more complex — like HP's 76 MIPS CPU due at the end of the month — it will become more difficult to tie them together in a tightly coupled technology, according to Tom Willmott, an analyst at Aberdeen Group in Boston. "Contention mounts as individual processors get more complex and they contend for space on the shared memory and operating system."

Legacy offers disk-array system for varied servers

BY RICHARD PASTORE
CW STAFF

The few disk array subsystems announced by file server manufacturers so far have been largely proprietary. Compaq Computer Corp., Dell Computer Corp. and Advanced Logic Research, Inc. have all developed or adapted proprietary designs. However, a Markham, Ontario-based firm last week unveiled a hardware-independent array that reportedly offers more efficient redundancy than its proprietary competitors.

Legacy Storage Systems, Inc.'s Legacy Multi-Additional SCSI Subsystem Hot Fix Device can hold up to eight hard disk, optical or tape drives and connects directly to small computer systems interface (SCSI) backplanes. It can be purchased with Legacy-labeled drives or will accept any manufacturer's SCSI drives, company officials said.

The system has a Level 5 fault-tolerant rating — space for redundancy takes up only 14% of total storage space. Level 4 devices like Compaq's and Dell's use 25% of space for redundancy, according to the redundant array of inexpensive drives rating pioneered by fault-tolerant software developer Pacstor, Inc.

The Legacy system also allows users to remove and replace defective drives without powering down the system and halting operations. The system then automatically initializes and rebuilds the new disk. Built-in software signals to the operator which drive is defective.

The system is compatible with Unix, OS/2 and Novell, Inc. Netware environments. Pricing is modular: A configuration with four 380M-byte disk drives lists for $13,799. It is slated to ship April 1, according to Legacy, formerly called Tense Lectronix Corp.

The Legacy machine uses array software from Santa Clara, Calif.-based Integra Technologies, Inc. The firm's Level 5 software has already been implemented on NCR Corp.'s System 3000 and has been licensed by IBM as well.

Intel 386

FROM PAGE 35

found projected growth for PC spending virtually cut in half, at 24.2%.

Dick Shaffer, editor and publisher of "Computerletter," is predicting single-digit growth in U.S. sales of PCs. Both Apple Computer, Inc. Chairman John Sculley and IBM Vice President William J. Filip have also suggested it might be hard for U.S. PC makers to break 10% growth this year.

Economic conditions are also impacting the vendor of choice. Of the 50 Fortune 500 companies surveyed, 76% said they are less willing to purchase PC clones from second-tier suppliers than from IBM or Compaq. IBM can expect to rake in 50% of these sales, the report said, followed by Compaq with 17%. The remaining 33% of purchases will be spread out over other vendors.

The overwhelming majority of respondents, 70%, plans to purchase 386-based computers; another 19% said they will buy 286-based PCs. Overall, 78% of PC purchases will be deployed on the desktop. Only 10% plan to purchase 1486-based systems, the same number that said they will use the new PCs as servers. Twelve percent of overall system purchases will be laptops.

La Jolla, Calif.-based Computer Intelligence looked at PC preferences in 32 major metropolitan areas, including what it said are the eight areas with the greatest commitment to PC technology: New York, Los Angeles, Washington, D.C., San Francisco, Chicago, Boston, Philadelphia and Houston.

Geographical breakdown

Most of the low-end purchases tend to be made in Baltimore, Cincinnati, Providence, R.I., and Buffalo, N.Y. By comparison, the major metropolitan areas with plans to buy a mix of higher systems — 386 and/or 486 — included Kansas City, Mo., Milwaukee, Houston and Portland, Ore. Yet these four represent less than 7% of the intended PC purchase plans.

The eight key metropolitan areas each tend to focus on a few industries. Computer Intelligence's study pointed to heavier PC purchasing in the discrete manufacturing, medical/education and process manfacturing segments. The banking/savings and loan industries appeared to be at the bottom of the list.

However, a separate study by bank automation consultant M. Arthur Gillis claimed that PC purchases will be a high priority at most banks in 1991. He said the PC's multidimensional personality makes it a "real banking hero." Not only can the PC be deployed in a stand-alone, distributed or shared mode, but it can function as a multifunctional terminal with a mainframe.

Banks of all sizes cited re-examinations of PC policies and procedures as "popular projects," whereas upgrades to or new purchases of main system hardware proved to be a low priority, Gillis said.

The study is based on a survey of more than 400 banks and thrifts of all sizes that was conducted in December 1990.

NEW PRODUCTS

Software utilities

Genesis Software Co. has released Version 2.0 of WS-Report, a personal computer-based tool for Cobol programmers.

The product's integrated modules facilitate the design, documentation and programming of Cobol-generated reports.

Version 2.0 ($115) runs on IBM Personal Computer XTs, ATs, Personal System/2s or compatibles.

Genesis Software
13318 Raven Roost
Cypress, Texas 77429
(713) 469-1537

Board-level devices

Sigma Designs, Inc. has introduced a lossless compression add-in board designed for Apple Computer, Inc. Macintosh environments.

Double Up ($229) can compress all types of files — image, data or programs — by an average ratio of 2-to-1 and can operate eight times faster than software-based compression and decompression utilities, according to the vendor.

Sigma Designs
46501 Landing Pkwy.
Fremont, Calif. 94538
(415) 770-0100

New Media Graphics Corp. has announced an MS-DOS-based product designed to perform Joint Photographers Expert Group standard compression and decompression on still-frame color images.

The Super Still-Frame Compression Board ($995) incorporates C-Cube Microsystems Corp.'s CL550 image compression processor, which reportedly allows the board to yield ratios ranging from 8-to-1 to 75-to-1.

New Media Graphics
780 Boston Road
Billerica, Mass. 01821
(508) 663-0666

Monitrix's diagnostic capabilities first class

Technology Analysis — A roundup of expert opinions on new products. Summaries written by free-lancer Susanne Weixel.

Cheyenne Software, Inc.'s, Monitrix 1.1, which monitors local-area networks running Novell, Inc.'s Netware operating system 2.1 or higher, offers first-class diagnostic capabilities, according to reviewers at personal computer and LAN publications.

Performance: The only monitor that can be loaded on the file server as a value-added process for Netware 286, Monitrix can also be used as a Netware loadable module for Netware 386. These features cause the package to require little random-access memory.

Diagnostics: Monitrix offers good, general-purpose diagnostic utilities and excellent background data-gathering. It can notify LAN managers about problems with disks, printers and individual workstations as well as about high-traffic conditions. However, it does not detect problems with cables.

Statistics: Users can track network activity over any time period to establish network performance trends. Node configuration and traffic statistics reports can be used in real time, printed in text and ASCII bar graphs or stored in ASCII files.

Ease of use: Monitrix uses Netware's menu interface to make users feel right at home.

Documentation: The manual includes explanations of installation and basic functionality.

Value: Monitrix costs from $795 to $995, depending on the version, and offers strong diagnostic features without diminishing performance. Reviewers recommend it be used in conjunction with a utility that supports configuration management.

Reviews Summary

Criteria			
Performance	NC	Sits quietly in background	4
Diagnostics			
Statistics	NC	An abundance of information	NC
Ease of use			
Documentation	?	Glossary helps interpret statistics	4
Reviewer's score			

Total review scores based on converting scores to 1-to-10 scale (see methodology). These are excerpts. Refer to actual articles for details: PC Week *7/2/90;* PC Magazine *10/3/90;* LAN Times *9/90. NC: no comment*

RATINGS

- Users: Gwain Bass, Bell Canada (*overall performance:* 9, cost: 10); Keith Mysliwiec, research and development facility (7, 9); Brian Sturgeon, Business Management Consulting (8, 10)
- Analysts: Roger Wood, Interconnect Network Consulting Group, Inc. (8, 8); Raghavan Bharat, Systems Integrators, Inc. (6, 6)
- Financials: Second-quarter revenue for period ending in December: $43.9 million compared with $44.4 million for second-quarter 1989. Net profits: $230,000 for the period compared with a net loss of $323,000 in the prior period.

Monitrix 1.1

Maximum score: 85

Points (maximum)	Category
26 (30)	Published reviews*
14 (20)	Analysts' ratings
12 (15)	Users' ratings
17 (20)	Cost evaluation

* Based on *LAN Times* and *PC Week* scores *(See financial information below)*

Cheyenne responds

Comments from Lisa Merkin, Cheyenne's marketing director:

Statistics: The next version, 2.0, includes a feature that analyzes statistics and suggests possible causes and solutions.

Ease of use: Use of Netware's front end cuts learning time. We are developing an optional [Microsoft Corp.] Windows front end.

Documentation: We are adding a section that lists error codes and explanations, and we are working on a supplement.

Emonitor+ affordable but tied to old cards

Emonitor+ 1.31

Maximum score: 85

Points (maximum)	Category
18 (30)	Published reviews*
15 (20)	Analysts' ratings
12 (15)	Users' ratings
18 (20)	Cost evaluation

* Based on *LAN Times* and *PC Week* scores *(See financial information below)*

Reviews Summary

Criteria	PC Week (1-to-10 scale)		
Performance	NC	Restricted to old adapter cards	3
Diagnostics	3		
Statistics	8	NC	NC
Ease of use	9		
Documentation	5	Lacks illustrations	2
Reviewer's score	6		

Total review scores based on converting scores to 1-to-10 scale (see methodology). These are excerpts. Refer to actual articles for details: PC Week *8/20/90;* PC Magazine *7/26/90;* LAN Times *9/90. NC: no comment*

RATINGS

- Users: Steve Cobleigh, Winchester Hospital (*overall performance:* 8, cost: 10); Allen Breedlove, Kaiser Permanente (7, 8.5); Greg Cain, NVR (8, 10)

"Most mortals using a 40-node or smaller network can't afford a protocol analyzer. Emonitor+ can detect bad packets on a node-to-node basis, and it is very affordable," Cobleigh said.

- Analysts: Roger Wood, Interconnect Network Consulting Group, Inc. (6.5, 7.5); Ron Meachino, Spectrafax Corp. (8, 8)
- Financials: Brightworks does not release financial information.

Brightworks responds

Comments from Trish Wood, Brightworks' sales/marketing department:

Performance: We do not plan to upgrade Emonitor+ to support newer cards. Emonitor+ is the product we offer for low-end diagnostics on Ethernet. We offer other LAN enhancement products for other needs.

Diagnostics and statistics: If you want solutions and sorting capabilities, you should purchase a more sophisticated, more expensive product.

Brightworks Development, Inc.'s Emonitor+ 1.31 offers local-area network monitoring on a less ambitious scale than Monitrix. However, it is compatible with all Ethernet-specific LANs, including those running Novell's Netware 286.

Performance: The package requires DOS 3.1 or higher and uses 256K bytes of random-access memory. It comes bundled with a remote access software program for troubleshooting from off-site locations. The software's only major fault is that it supports only older, slower 8-bit Ethernet cards and is not compatible with Netware 386. According to *PC Week*, it is best suited for networks with a maximum of one server per segment.

Diagnostics: Emonitor+ is useful for identifying unterminated and broken cables, isolating faulty Ethernet cards, measuring the level of corrupted data in real time and measuring network utilization. What it does not do is recommend solutions.

Statistics: Reports are provided on the good and bad packets of data that circulate on the LAN cable. This feature gives a good picture of LAN traffic over a period of time, and administrators can easily determine which workstation is responsible for the greatest amount of bad data. One drawback is the lack of capabilities for sorting good and bad packets or workstation IDs.

Ease of use: Emonitor+ is easy to install and easy to operate.

Documentation: Reviewers say the manual is easy to understand, although it lacks illustrations.

Value: Emonitor+ costs $295 per server, which, according to *LAN Times*, makes it worth installing even if you also have a $20,000 protocol analyzer.

Methodology: *Published reviews: average of* PC Week *and* LAN Times' *numeric scores multiplied by a weight of three.* LAN Times' *1-to-5 weighted ratings were converted to a 1-to-10 scale, where 10 is excellent. Analysts: average overall product ratings multiplied by 2. Users: average overall product ratings multiplied by 1.5. Cost: average cost to get product up and running ratings from both groups multiplied by 2. Financials: total possible score was lowered from 100 to 85 because insufficient financial ratings were available for the products covered.*

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COMMENTARY

Tony Friscia

Still not on the MAP

About seven years after Manufacturing Automation Protocol (MAP) was conceived by General Motors and its allies, MAP products have still not achieved large-scale implementation in manufacturing environments.

The plant networking market grew 16% in 1990. Consistent with the last few years, DEC's Decnet leads with revenue of approximately $150 million, stemming from the sale of close to 40,000 network nodes within manufacturing plants. This is a 15% increase over 1989's $130 million. [Note: These numbers reflect revenue from actual nodes installed within production sites, not laboratory nodes or sales to OEMs.]

Despite Decnet's dominance, the fastest growing segment of the market continues to be PC networking. This includes a range of networks that connects PCs, including products from Novell and 3Com. [Note: Both Decnet and general-purpose Ethernet vendors also connect PCs. However, for the purposes of this analysis, this category only includes networking products that are targeted specifically at connecting PCs.] That $75 million market grew 20% to $90 million in 1990. In terms of number of nodes, PC networking is actually the largest segment of the market, with approximately 45,000 nodes installed in 1990.

The only other significant

Continued on page 44

Cellular modems put the office on the road

ANALYSIS

BY ELLIS BOOKER
CW STAFF

Traffic across the nation's cellular radio networks has been lopsidedly oriented toward voice communications since the first commercial system began operating in Chicago in 1983.

That could change, as these networks — like their terrestrial counterparts — make their inexorable transition from analog to digital technology.

However, a more important force in the market, according to observers, could be the gravitational effect of laptop computer vendors who are signing joint-development agreements with makers of cellular modems to bring forth integrated systems during the next 18 months.

"Right now, the numbers [of cellular modem users] are very small — say 1% to 2% of the installed base," said Bob Adair, executive vice president at Dallas-based Spectrum Information Technologies, Inc., which owns laptop reseller Data One.

Adair said he blames the low penetration of cellular data applications on the lack of a distribution channel. "The limitation on using cellular has been the inability to get the product into the customer's hands," he said.

Spectrum, Microcom, Inc. and laptop vendor Toshiba America Information Systems, Inc. plan to bring a multipurpose cellular/terrestrial modem to Toshiba's products.

While conventional land-line modems can be used on a cellular network, specialized cellular units are designed to accommodate peculiarities of the media. Specifically, they can deal with the signal "hand-off" that occurs when a vehicle moves through the coverage area of the antennas that honeycomb a cellular network.

Strengths of the competing cellular modem standards, as outlined by International Data Corp.

TDMA
- Twenty-year history.
- 1991 solution available.
- Less vulnerable to service disruption.

CDMA
- Potential 10- to 20-fold capacity gain.
- Incremental cost per subscriber only $250.
- Well-designed multipath traits.

Digital alternatives for cellular networks are intended to increase the capacity of these networks, which can now support about 60 simultaneous voice channels per analog cell and thus lead to data-oriented services.

Recently, a debate has erupted over which digital scheme will be used. Last year, the Telecommunications Industry Association voted for the Time Division Multiple Access (TDMA) method. TDMA is believed to provide 180 to 240 voice channels per cell, or three to four times the current capacity.

However, a latecomer coding scheme called Code Division Multiple Access (CDMA), which proponents think will increase the number of users per channel

Continued on page 44

Airline stays true to host-based system

BY ELISABETH HORWITT
CW STAFF

ARLINGTON, Va. — As local-area network installations grow, so does users' hunger for independence from information systems departments and their host-based systems. This scenario is increasingly typical at large companies — but not, apparently, at US Air.

The airline has, indeed, been moving its users to LANs at a steady rate — but strictly within the structure of IBM's Systems Network Architecture (SNA) and under the aegis of its IS managers, according to George Balog, US Air's vice president of communications.

For now, at least, communications will take place primarily among users on the same LAN and between LAN workstations and the mainframe, Balog said. "There is not a lot for us to gain in our current vision with LAN-to-LAN traffic."

The reason for this lies in the nature of US Air's business as well as in the choices it has made about which network configurations best support it, Balog said. For example, it is necessary to keep track of seat inventory for a given flight, particularly for a flight that may pick up passengers at an interim stop, to ensure that two different sites do not assign the same seat. "You could do this through a mainframe or by a LAN-to-LAN connection, but we believe the mainframe is the best place to do it," Balog said.

US Air is committed to IBM's SNA protocols for communications between both LANs and mainframes and among different workstations and servers within a LAN, Balog said. "We have come to the conclusion that we can do what we need to do with SNA" in terms of meeting users' application needs, he added. Both IBM's peer-to-peer LU6.2 protocol and LU2 terminal protocols are being used.

Most of US Air's LAN architecture work is now being done on OS/2 workstations and makes use of IBM's LAN Server, Balog said.

Stepping carefully

The airline has "avoided the trap" of allowing other network systems, such as Novell, Inc.'s IPX, to proliferate on its LANs, Balog said. "So we don't have to retrofit a lot of alien protocols into our integrated corporate network."

Not that US Air thinks IBM's current SNA strategy is perfect as it is. The airline is "waiting patiently" for a number of LU6.2 enhancements, including wider implementation of Common Programming Interface for Communications (CPIC) across IBM's Systems Application Architecture main platforms, Balog said. CPIC will make it easier to develop applications on LU6.2 and will also ensure interoperability of those applications across the different IBM systems.

"We are finding very good use for LU6.2, for application-to-application interconnection between mainframes and departmental systems that require cooperative processing," Balog said. "Without LU6.2, we would have to invent the dialogue for addressing those systems."

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Smart-hub rollout race speeds up

Synoptics, Cabletron add series of enhanced modular products

BY JOANIE M. WEXLER
CW STAFF

Relentless in their endeavors to enrich their smart hubs, market leaders Synoptics Communications, Inc. and Cabletron Systems, Inc. continue to one-up each other in modular product rollouts.

The companies have recently bestowed users with added network management capabilities and the ability to integrate computing islands into the corporate network through their hubs.

Smart hubs are intelligent wiring centers used to interconnect each device on one or more local-area networks. The hub logically supports the LAN topology and access method.

Synoptics made significant enhancements to its Lattisnet hub last week, including integrated Ethernet and token-ring network management based on the Simple Network Management Protocol. Sample pricing, according to Synoptics, is $2,295 for an under-200-node network. With the announcement, Synoptics unwrapped a remote Ethernet router module option for Lattisnet.

Partnership expected

Cabletron, which announced network management enhancements for its Multi Media Access Center (MMAC) last month, said it will announce a partnership with Cayman Systems, Inc. today to allow Cayman's Localtalk-to-Ethernet gateway to be incorporated into the MMAC. Localtalk is the physical medium underlying an Apple Computer, Inc. Appletalk LAN.

The Synoptics development enables customers with mixed Ethernet and token-ring environments to manage both network types from a single management station.

"Customers now start out with two icons side by side on their screen: one for Ethernet and one for token-ring," Synoptics President Andrew K. Ludwick said. "Click twice on an icon," and the user can view deeper levels of the network.

The dual network management approach was closely tied to Synoptics' rollout of the Network Control Engine module for Lattisnet. The module is a Sun Microsystems, Inc. Sparcstation-based processor dedicated to network management.

"The new engine gives you the horsepower to manage your network at the physical levels and the higher levels at the same time," commented Jeff Marshall, managing director of communications at Bear Stearns & Co., an investment banking and brokerage firm in New York. Bear Stearns runs mixed token-ring/Ethernet environments totaling 5,000 Synoptics nodes.

"When you start getting into thousands of nodes and managing remote sites around the world as we do, the need for simultaneous management becomes more pressing," Marshall said. "The Synoptics approach closely parallels the structure of our organization: distributed."

> "IT'S AT THE building level that you need to physically integrate management of the disparate LANs."
>
> TODD DAGRES
> THE YANKEE GROUP

The Yankee Group, a research firm in Boston, estimates that 90% of Fortune 1,000 companies have mixed Ethernet and token-ring environments.

"It's at the building level that you need to physically integrate management of the disparate LANs," Yankee Group analyst Todd Dagres said. "Right now, only Synoptics and Cabletron can provide you with a hub that does that."

Dagres pointed out that the difference between the two vendors' approaches is that "Cabletron is spending its money on centralized management with its [artificial intelligence-based] Spectrum enterprise network manager," he said. "Synoptics is putting its money on driving downward and integrating local management with existing enterprise managers, such as [IBM's] Netview. I think the Synoptics' approach more closely fits the client/server computing model."

Synoptics, Cabletron and other suppliers are scurrying to differentiate themselves by continually dumping new functionality into their boxes, including bridging, routing, terminal serving and support of additional LANs.

Cellular

FROM PAGE 43

by up to 10 times over existing systems, is now supported by the carriers in three major U.S. cellular markets.

On the terminal side, a likely next step will be to put the cellular modem and cellular phone into a single device next year.

Even as cellular networks convert to digital signaling, they will stay with circuit-switching for the foreseeable future. While circuit-switching is a good medium for long connections and the transmission of bulk data, it is not considered optimal for applications characterized by short, bursty data traffic.

For that, packet networking is the answer. Both Ram Mobile Data, Inc., based in New York, and Ardis, the Motorola, Inc. and IBM joint venture, are in the process of deploying nationwide radio packet networks.

"With cellular there is a lot of setup time . . . and you're billed for that time," said George Dennis, the corporate communications manager at Ram.

During the time a customer is waiting for the first ring, "We can ship 10,000 characters or more," he said.

Ram, which made its name in the paging business, inaugurated its nationwide radio packet data network last month in 10 cities.

The battle between the two will involve competing and incompatible hardware and software standards. Ram uses Mobitex, an open architecture developed in the early 1980s by the Swedish telecommunications authority with Ericsson, Inc.; Ardis uses Motorola's proprietary scheme.

Wall Data adds PC-to-mainframe software

BY JIM NASH
CW STAFF

REDMOND, Wash. — Wall Data, Inc. has announced several personal computer-to-IBM mainframe software packages, all of them extensions of its Rumba product line. The new products are designed to get employees in virtually every corner of a company using mainframe-based applications.

Rumba Graphics accesses mainframe graphics applications and integrates mainframe data with PC-based graphics displays.

Rumba Gateway Manager organizes gateway traffic from IBM's Token-Ring, Novell, Inc.'s Netware and Microsoft Corp.'s LAN Manager networks.

The gateway spreads traffic among devices from Wall Data, IBM, Digital Communications Associates, Inc., Attachmate Corp. and others.

Wall Data also announced support for connections to the IBM Application System/400. All the new products are expected to ship this month, according to a company spokeswoman.

A tough job

Transferring data "is still relatively cumbersome," said Mike Jones, vice president of information systems at LaSalle Partners Ltd. in Chicago. Indeed, it is enough to cause him to move certain applications from the mainframe to local-area networks.

"It enables people who are stuck with mainframes, mainly IBMs, to make good use of applications that were not used very much before because of how difficult it was to access them on the mainframe," said Shmuel Halevi, vice president of The Technology Research Group, Inc. in Boston.

Rumba "is another one of the fancy terminal emulators that appeals to a certain group of users: those in an IBM environment that haven't made the commitment to client/server architecture," said Steve Wendler, an analyst at Gartner Group, Inc. in Stamford, Conn.

Products such as Wall Data's Rumba Graphics could have the same effect, albeit on a smaller scale, as spreadsheet software, Halevi said. Rumba, which is based on Microsoft's Windows, automates the process of holding a host session, he said, and with the new capability, makes it easier to use data stored on the mainframe.

Rumba should have some success as a front end to IBM's Officevision VM, Wendler said. "IBM's slowed — arrested, almost — introduction of Officevision to the desktop" can be used to Wall Data's advantage with this product, Halevi said.

Friscia

FROM PAGE 43

segment of the market is represented by the general-purpose Ethernet vendors, led by Ungermann-Bass. This group of vendors accounts for approximately $50 million in revenue and 13,000 nodes.

Rounding out the market are relatively small shares for 802.5 (token-ring) and 802.4-based MAP. The MAP market has remained flat for the last three years, after its peak in 1986, when revenues were approximately $25 million compared with less than $15 million this year. Large-scale MAP implementations have found primary appeal among U.S. and European automotive vendors. There has also been support from the Japanese for MAP, largely from Japanese factory automation vendors for incorporation into their products.

I do not expect these ratios to change significantly in the coming year. The one key trend, as indicated earlier, is an increasing demand within the market for Open Systems Interconnect (OSI) — more than 80% of users surveyed say they intend to migrate to OSI.

The question is, when will this demand translate into a significant market for products? Most users expect this evolution to OSI to be slow, and they plan to migrate at the pace of their primary systems vendor. For example, Decnet users plan to migrate to OSI through DEC's implementation of Decnet Phase V (delayed in 1990), which bridges DEC's proprietary protocols and OSI.

From the above numbers, it is easy to conclude that the MAP movement has been a bust. On the contrary, the MAP movement has accomplished several useful goals.

First, it has raised user awareness of plantwide backbone networks. Such networks are now responsible for the transfer of data throughout a plant and up to the data processing and plant management layer. They provide the foundation of plantwide integration.

Second, the movement has created a wide-scale user demand for standards-based networking within the manufacturing environment.

The third useful outcome of MAP's emergence is the development of the Manufacturing Messaging Standard (MMS), a standard means of communicating with plant floor devices. I believe that this standard will be the most widely accepted plant floor application layer communications standard in the 1990s. DEC and Hewlett-Packard have both announced support for MMS over their respective 802.3-based networks, and we expect IBM to announce a similar capability soon.

MAP has also spurred manufacturing user requirements for fully compliant OSI standard networking.

It could be said that MAP was the forerunner to OSI, the final stage of standard network development and represents a worldwide industry and standards convergence. With the basic transmission issue resolved, user attention has shifted to upper layer software issues. In the 1990s, the manufacturing communications market will be characterized by a slow transition to OSI networks.

Friscia is president of Advanced Manufacturing Research, Inc., a research and consulting firm in Cambridge, Mass.

NEW PRODUCTS

Gateways, bridges, routers

Fibronics International, Inc. has added lower priced nodes to its System Finex family of Fiber Distributed Data Interface (FDDI) products.

The products support the IEEE translation bridging standard for FDDI-to-Ethernet bridging and interoperate with Digital Equipment Corp.'s FDDI bridge and with directly attached workstations. A single port is priced at $14,990, and an additional Ethernet port can be purchased for $5,000.

Fibronics International
Communications Way
Independence Park
Hyannis, Mass. 02601
(508) 778-0700

Persoft, Inc. has introduced the Intersect Remote Bridge, a device that uses wireless technology to connect Ethernet local-area networks.

The product can be used instead of leased-line connections for several bridging applications; it can also link Ethernet LANs that are up to 800 feet apart, the vendor said.

The Intersect Remote Bridge runs on a dedicated IBM Personal Computer AT or compatible and is priced at $4,995.

Persoft
UW Research Park
465 Science Drive
Madison, Wis. 53711
(608) 273-6000

Retix's 4941 Remote Bridge/Router combines bridging and Transmission Control Protocol/Internet Protocol routing for use in complex network configurations and applications that demand routing and bridging.

The device ($6,250) is said to act as a point-to-point bridge/router or as a high-speed feeder for complex network topologies.

Retix
2644 30th St.
Santa Monica, Calif. 90405
(213) 399-2200

Network management

Stratacom, Inc. has announced an enhanced version of its Strataview network management system.

Strataview Plus ($12,000) runs on a Unix-based workstation and features color graphics with zoom-in capabilities, pull-down menus and mouse support. The product is targeted at users of networks equipped with more than 20 fast-packet nodes and is scheduled to be available next month.

Stratacom
3175 Winchester Blvd.
Campbell, Calif. 95008
(408) 370-2333

Fibermux Corp. has announced an integrated graphical network management platform that allows a Sun Microsystems, Inc. Sparcstation to act as a central control point for local-area networks such as Ethernet, token-ring and Apple Computer, Inc.'s Appletalk.

The company's Lightwatch Simple Network Management Protocol-based network management software package can work in tandem with Sun's Sun-Net Manager to enable users to manage a multiprotocol network of hubs, workstations, routers or bridges.

Lightwatch is priced at $4,500, and Sun-Net Manager costs $3,000.

Fibermux
9310 Topanga Canyon
Chatsworth, Calif. 91311
(818) 709-6000

Network Management, Inc. has announced I-Mind, a software package designed to facilitate the management of international networks.

The product enables network managers to automatically identify and map out economical routes for data communications traffic and to determine cost-effective methods of positioning communications devices in or throughout segments of a network. It features graphics that allow network managers to view how a network is being configured.

I-Mind is priced at $24,000.

Network Management
11242 Waples Mill Road
Fairfax, Va. 22030
(703) 359-9400

Modems

Codex Corp. has introduced the 326X series of V.32 bis/V.32 modems.

The series includes Model 3260, a stand-alone device that operates at asynchronous and synchronous rates of up to 14.4K bit/sec.; Model 3265, the international version of the 3260; Model 3262, a double-density nest-card unit; and Model 3267, the international version of the Model 3262.

Model 3260 costs $1,195, and pricing for nested models begins at $2,195.

Codex
20 Cabot Blvd.
Mansfield, Mass. 02048
(508) 261-4655

Memotec Data, Inc. has announced the DA 3214 and the IDM 19.2A, both scheduled to ship in the second quarter.

The DA 3214 is part of the company's Dialaccess product family. It features a basic data transfer rate of 14.4K bit/sec. and can operate in asynchronous or synchronous modes over two-wire dial-up or two- or four-wire leased-line interfaces.

The product is priced at $1,295 for a stand-alone version and $2,395 for a dual-modem rack card version.

The IDM 19.2A is a member of Memotec Data's IDM family of analog diagnostic modems. The device uses 64-state eight-dimensional trellis-coded modulation to deliver asynchronous or synchronous data transmissions across analog leased circuits in point-to-point applications.

The modem is priced at $4,995 for a stand-alone version and $4,895 for a rack-mount version.

Memotec Data
600 Rue McCaffrey
Montreal, Canada H4T 1N1
(514) 738-4781

If you want to sell to NTT, there's something you need to know...

Nippon Telegraph and Telephone Corporation, Japan's largest telecommunications service provider, invites computer industry manufacturers, software companies and users to attend two free seminars on the Multivendor Integration Architecture (MIA) it has developed with NTT Data Corp., IBM Corp., Digital Equipment Corp., NEC Corp., Hitachi Ltd. and Fujitsu, Ltd.

The seminars, which will be held at the Four Seasons Hotel, one block from the George R. Brown Convention Center, in Houston during Supercomm '91, will introduce the MIA concept and explain the benefits that it offers to computer vendors who wish to sell to NTT.

Session I, the MIA Overview, will present a two-hour summary of MIA and its objectives, and will briefly introduce specifications and interfaces. Speakers will include MIA development staff from NTT.

Session II, the Detailed Technical Presentation, will offer an in-depth, three-day introduction to all aspects of MIA, a detailed explanation of all interfaces and specifications and opportunities to ask questions and discuss. Speakers will include technical experts from NTT and its research partners.

MIA specifications will be a basic requirement for future purchases of general purpose computers and their software by NTT and NTT Data Corp. Since no other MIA seminars are planned, NTT especially urges companies in the U.S. computer industry to attend.

To register for either session, or to receive a detailed schedule, please call the NTT Seminar Hotline at (212) 546-1526 or send a fax message to Mr. Yukio Kikuta at (212) 286-8970. We look forward to seeing you in Houston.

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SYSTEMS & SOFTWARE

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MIA Seminar Schedule

Session I MIA Overview	March 20, 1991 9:30-12:00 noon	Salon A Four Seasons Hotel 1300 Lamar St., Houston
Session II Detailed Technical Presentation	March 20, 1991 1:30-5:00 p.m.	Salon A Four Seasons Hotel
	March 21, 1991 9:00 a.m.-5:00 p.m.	Conroe Room Four Seasons Hotel
	March 22, 1991 9:00-12:00 noon	Conroe Room Four Seasons Hotel

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MANAGER'S JOURNAL

EXECUTIVE TRACK

C. S. "Jack" Schrodel, former director of network services at Sun Co., has joined **The Executive Insight Group, Inc.**, an information systems management consulting firm in Bryn Mawr, Pa.

A 29-year IS veteran, Schrodel will focus on outsourcing and network, data center and telecommunications management issues. At Sun, he was instrumental in the oil firm's recent outsourcing of its data center to Andersen Consulting. He also managed Sun's network utility as a profit center selling services to third parties.

Schrodel holds a bachelor's degree from Johns Hopkins University and a master's degree from the University of Pennsylvania. He participated in the Executive Development Program at Pennsylvania State University in 1986.

.....

Jerry Henshaw has been promoted to the position of senior vice president of technology and communications at **United Video Satellite Group**, a Tulsa, Okla.-based satellite carrier of CATV services nationwide.

Henshaw was most recently vice president of engineering, research and development. In his new post, he is responsible for corporate data processing, voice and data networks and engineering research and development for the firm's divisions.

Henshaw joined United Video in 1983. Before that, he was research manager at Seismograph Service Corp. in Tulsa. He also held research and design engineer positions at Amoco Production Co. and Telex Computer Products.

He holds a master's degree from the University of Tulsa.

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Who's on the go?

When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Carmaker turns over career tracks

Rotating IS jobs is key in Nissan's plan for successful staff development

BY JEAN S. BOZMAN
CW STAFF

Change is no stranger at Nissan Motor Corp., the Carson, Calif.-based U.S. subsidiary of the Japanese automobile giant. So there was surprise but not shock when Nissan's Information Systems Division unveiled a major management reorganization one month ago.

"What we announced is rotational assignments for career development," explains Evan Wride, 42, director of IS. "Several of my direct reports are swapping jobs. Everybody needs to move into different functional areas if they want to have my job."

Wride's rotation plan is clearly in step with the management practices of parent company Nissan Motor Co., where functional rotation is a linchpin of career development. "If the person doesn't know anything about the area he's going into," Wride says, "it's probably the right thing to do."

Alan Levenson

Nissan's *Sendaba (left) and Wride say change can be beneficial for the career development of the carmaker's IS workers*

Culture shock

The motivation for change is clear: Nissan is fighting an uphill battle to push past Toyota Motor Corp. and Honda Motor Co. as the largest Japanese carmaker in the U.S. market. "The way to change the culture is to either bring in new people or to give the existing people a new culture," Wride says.

Wride's move to change responsibilities within the 350-person IS staff has the wholehearted support of Sheleme Sendaba, a former General Motors Corp. executive who was named Nissan's vice president of finance and IS six months ago. Wride reports to Sendaba, who plans the funding of IS projects and deals with Nissan's senior management.

"I think it's very important that we reorganize as business needs," Sendaba says. "People who understand database management should understand about systems development, and people who run computer operations should, too."

Among the top managers, for example, one woman who had managed the applications group was moved into the database design group. Another woman, who managed IS supporting the parts and service division systems, was moved into more general applications development.

Change on such a large scale — in Nissan's case, announced at a divisional meeting on a Friday morning — causes ripples of anxiety throughout any organization. Although no jobs were threatened, the change caused many Nissan IS employees to whisper excitedly about it in the hallways.

"Change is both good news and bad news," Wride notes. "There's something built into people that treats most change as negative. But if you don't change, you become lethargic, like

Continued on page 50

Outlook turns cloudy, dreary for job hunters

BY ELLIS BOOKER
CW STAFF

Statisticians and people mailing out resumes have discovered the *same thing: Information* systems departments have slowed their hiring.

Job-seeking IS workers can take cold comfort in the fact that their industry is generally faring better than the rest of the economy, in which the employment outlook is dismal by most measures. However, IS hiring matches the regional pattern in the broader economy, in which some regions — notably the Northeast — have felt the recession more keenly than others.

In a slow market, firms are seeking "perfect fits," employees with everything called for in the job description, said Steve Joffe, vice president of Source EDP, a Dallas-based placement firm. What's more, because it is a buyer's market, some firms are trying to get superb workers at cut-rate prices.

Bob Hildreth, who owns two Minneapolis-based placement companies, Electronic Systems Personnel, Inc. and ESP- Software Services, Inc., said he did not detect an uptick in hiring in the first quarter of this year.

An uptick traditionally occurs in the first part of the year, when budgets and major projects are allocated.

"In past years, we'd see a tremendous increase in the first quarter," he said. Last year, openings were up 15%, while this year, hiring has remained steady, he added. Other placement firms said the traditional first-quarter spike was delayed this year because of the war in the Persian Gulf.

The skills that are marketable right now, a number of placement firms said, include computer-aided software engineering and fourth-generation languages. Experience with IBM's mid-range Application System/400 is also helpful, they added.

Bleak forecast

The hiring outlook for all U.S. employment continues to look dismal, according to the most recent survey published by Manpower, Inc. The Milwaukee-based employment firm, which has measured quarterly changes in projected job hiring since 1976, projected the second quarter of this year will reach 1982 recession levels nationwide, with some areas falling below these levels.

Manpower's survey of more than 15,000 firms found that 18% will add to their work force, while 13% will reduce employment. This 5% net hiring strength compares with a plus 18% factor one year ago.

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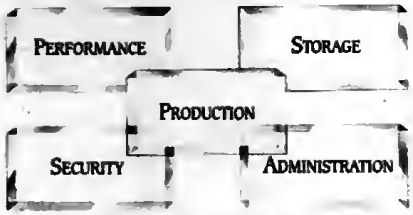

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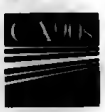

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Carmaker

CONTINUED FROM PAGE 47

a dinosaur, and you don't survive."

Many senior managers took the change in stride. "IS is probably the place to invest when there's an economic downturn," one says. "You have to do everything a lot better than your competitors. You have to target better and send the cars to the right places." He says the organizational changes were made by consensus after discussions with the affected personnel.

Two of Nissan's key corporate strategies announced last year are just beginning to play out. According to one strategy, each of Nissan's three global operations in Japan, Europe and North America will be run locally using local people, parts and materials as well as sales forces to give Nissan greater market share. The other related strategy pushes decision-making to the three global divisions — and then to the regions within those divisions.

Still, many IS functions, such as hardware purchasing and systems development, have remained centralized. "You cannot afford to have IS organizations in 14 regions [throughout the U.S.]," Sendaba says. "It doesn't make economic sense."

Nissan coordinates its hardware and software purchases from IBM on a worldwide basis, Sendaba says. This allows discounts for volume buying and maintains compatibility between the firm's computer systems on the three continents.

Nissan has one five-processor IBM 3090 mainframe at its Carson headquarters and more than 20 IBM Application System/400s at its distribution centers in major U.S. ports from Oakland, Calif., to Norfolk, Va. IS executives make annual trips to Japan to coordinate IS strategy, but those trips are supplemented by daily phone calls and facsimile messages to ensure Nissan's compliance with the specifications of the parent Nissan's global communications network. In addition, several Japanese executives have been assigned to work with Nissan IS staff members on a day-to-day basis in the U.S.

Favorable flexing

Wride's message is that the ability to change works in Nissan's favor. Flexibility will give Nissan, the sixth-largest player in the U.S. market, a chance to respond to changing American tastes in cars, he says. Just last year, Nissan launched its Infiniti division, which required a satellite network, a chain of more than 70 new dealerships and the information systems to support them (see story below).

"The business application is driving the whole thing," says Wride, who presided over similar reorganization plans at Los Angeles-based Denny's Restaurants in the mid-1980s. Another reorganization took place six months after Wride came to Nissan in 1989.

Rotation of responsibilities was a way of life at Denny's, where Wride alternately headed up systems development, ran computer operations and was assistant controller. One former colleague says Wride's philosophy worked there, too.

"It's a philosophy we adopted at Denny's that each of us on the management team would have several lateral moves as part of any ultimate upward mobility," says Rich Kislowski, who was vice president of IS at Denny's during much of the 1980s. "The lateral moves were planned moves, but they broadened the base of knowledge," he says. Kislowski is now vice president of information services at Pacificare Health Systems, Inc. in Cypress, Calif.

Wride says the IS director's task is to properly orchestrate the strengths of IS employees. "If you hire the right people, it pays off for you and your company forever," he says. "You have to set the vision and the direction. Then you have to get the right people in place, at the right levels, so they can execute the vision."

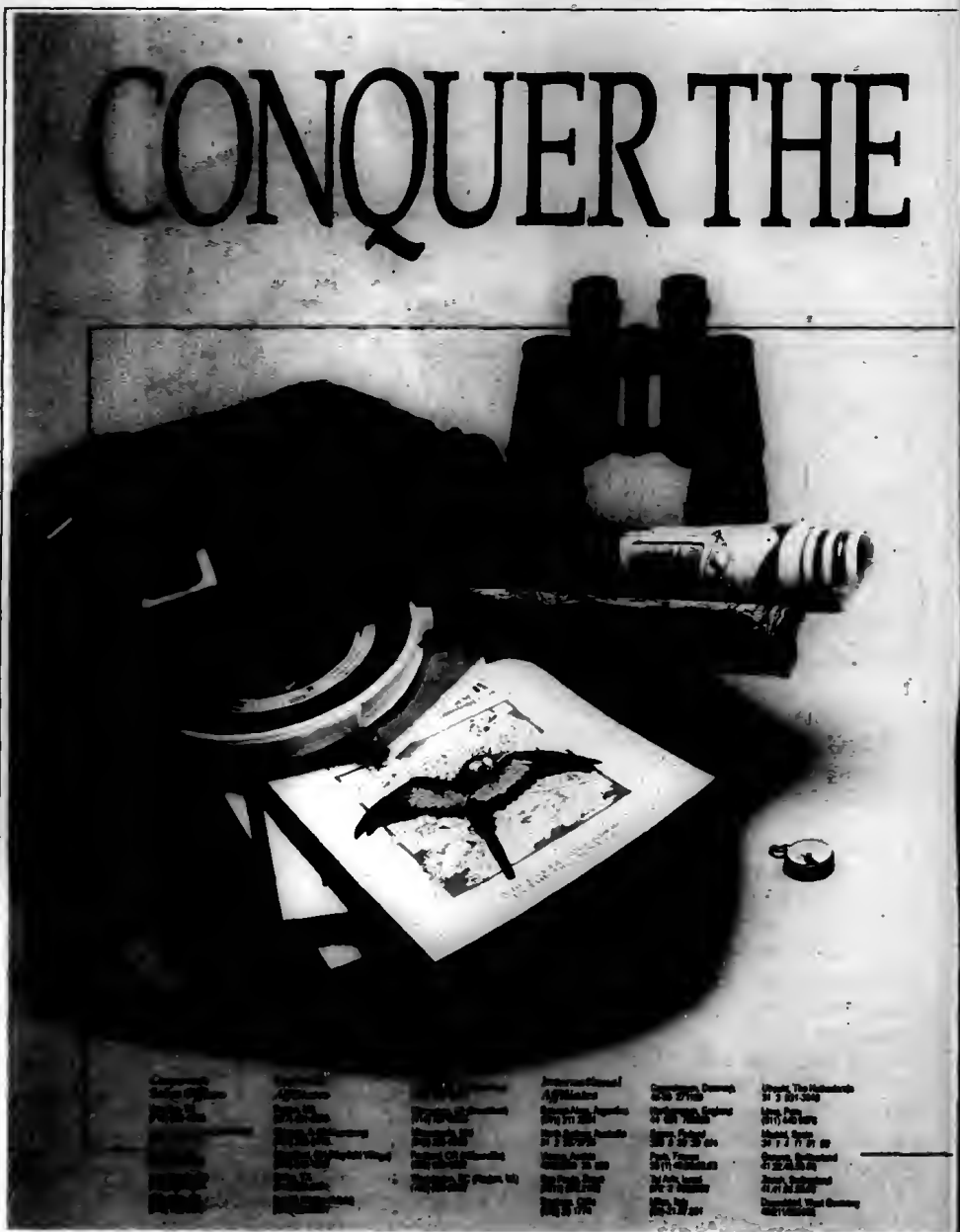
Luxury software

Nissan's much-heralded introduction of the Infiniti luxury automobile required a new set of TV commercials — complete with rainstorms and ripples in tranquil ponds — and a new set of software applications to support the emerging business.

Corporate databases showing preferences for car colors and customer profiles had to be built. As a new chain of more than 70 Infiniti dealerships popped up across the country last year, each showroom had to be linked by a satellite network with Nissan headquarters. Dubbed Infinitinet, the network allows individual dealerships to access Nissan's corporate databases.

The high price tag of the Infiniti, which ranges from approximately $20,000 to the mid-$40,000s, puts it in a special niche among Nissan models. Accordingly, the IS division is building automated order entry and the global parts locater systems to support the sales of all other Nissan cars. Another system under development will allow Nissan dealers to place orders from their car telephones or laptop computers.

JEAN S. BOZMAN



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Focus on Operations XI. Las Vegas, April 7-11 — Contact: Computer Operations Management, Orange, Calif. (714) 997-7966.

IEEE International Conference on Robotics and Automation. Sacramento, Calif., April 7-12 — Contact: Robotics and Automation, Boca Raton, Fla. (407) 483-3037.

Service Trends Conference. San Francisco, April 8-9 — Contact: Lori Larsen, Ledgeway/Dataquest, Lexington, Mass. (617) 863-8500.

Information Security Managers Symposium. Chicago, April 8-10 — Contact: Pamela Binett, MIS Training Institute, Framingham, Mass. (508) 879-7999.

Loop Implementation: The Next Steps. Monterey, Calif., April 8-10 — Contact: Electronicast, San Mateo, Calif. (415) 572-1800.

Turning Audit Costs Into Profits: Superstrategies for the Internal Audit Department of the 1990s. San Francisco, April 8-10 — Contact: Pamela Binett, MIS Training Institute, Framingham, Mass. (508) 879-7999.

Computers and Software for Manufacturing Expo. Chicago, April 8-11 — Contact: Doug Kunz, Cahners Exposition Group, Stamford, Conn. (203) 352-8202.

National Design Engineering Conference. Chicago, April 8-11 — Contact: National Design Engineering, Stamford, Conn. (203) 964-0000.

CBC Exchange. Cambridge, Mass., April 8-12 — Contact: Margaret Murphy, Computer Sciences Corporation Exchange, Cambridge, Mass. (617) 499-1227.

The Conference Board Information Management Conference. New York, April 9-10 — Contact: Conference Board Registrar, New York, N.Y. (212) 339-0290.

Seybold Technology Forum. Cambridge, Mass., April 8-11 — Contact: Deborah Hay, Seybold Computing Group, Boston, Mass. (617) 742-5200.

The Software Development Management Conference. San Francisco, April 8-12 — Contact: Software Development Conferences, San Francisco, Calif. (415) 995-2471.

Supercomputer Conference. Newport, R.I., April 8-12 — Contact: John Miguel, Federal Information Processing Council, Middletown, R.I. (401) 841-4591.

Society for Information Management 1991 Integrational Member Conference. Tucson, Ariz., April 10-12 — Contact: SIM, Chicago, Ill. (312) 644-6610.

Unix Challenge 1991. Tyngsboro, Mass., April 10-12 — Contact: Andree Puttaine, Boston University, Corporate Education Center, Tyngsboro, Mass. (508) 649-9731.

Voice '91. Anaheim, Calif., April 10-12 — Contact: Voice '91, Houston, Texas (713) 974-0637.

APRIL 14-20

Congress on CIM Databases. Cambridge, Mass., April 14-17 — Contact: Wilma A. Horwitz, CAD/CIM Alert, Boston, Mass. (617) 232-8080.

International Technical Communication Conference. New York, April 14-17 — Contact: ITCC, Tinton-wood, N.Y. (914) 742-5999.

Information User Association: Architecting for the '90s. Salt Lake City, April 14-18 — Contact: IUA Headquarters, Chicago, Ill. (312) 644-6610.

Nomtec 3.0. Atlanta, April 14-19 — Contact: Dave Cochrane, National System Programmers Association, Milwaukee, Wis. (414) 423-2420.

Comtex Users' Exchange. Baltimore, April 15 — Contact: Ron Black, CUE, New York, N.Y. (212) 633-5080.

Cardtech '91. Crystal City, Va., April 15-17 — Contact: American Electronics Association, Santa Clara, Calif. (408) 987-4356.

Knowledgeware International User Conference. Atlanta, April 15-17 — Contact: Knowledgeware, Atlanta, Ga. (404) 231-8575.

Securetech '91. Crystal City, Va., April 15-17 — Contact: American Electronics Association, Santa Clara, Calif. (408) 987-4356.

Wireless Data Networks Conference. Washington, D.C., April 15-17 — Contact: Business Communications Review, Hinsdale, Ill. (800) 227-1234.

Lap & Palmtop '91. New York, April 16-17 — Contact: Peter O'Connor, Laptop Expositions, New York, N.Y., (212) 682-7968.

Downsizing Conference: Moving from Mainframes to PCs. Boston, April 16-17 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

Electro/International. New York, April 16-18 — Contact: Alexes Rasevich, Electro/International, Los Angeles, Calif. (213) 215-3976.

IMSL User Group Europe Conference. Paris, April 17-19 — Contact: Karen G. Meador (713) 782-8060.

Instore Systems: The Key to Better Customer Service. Orlando, Fla., April 17-19 — Contact: National Retail Federation, New York, N.Y. (212) 563-5113.

International Conference on the Application of Manufacturing Technologies. Alexandria, Va., April 17-19 — Contact: Lynn Ruston, The Society of Manufacturing Engineers, Dearborn, Mich. (313) 271-1500.

World Computer Law Congress. Los Angeles, April 18-20 — Contact: Michael D. Scott, Center for Computer/Law, Manhattan Beach, Calif. (213) 689-5186.

APRIL 21-27

Adapso Management Conference. Miami, April 21-24 — Contact: Adapso Education Department, Arlington, Va. (703) 284-5302.

Electronic Funds Transfer Association Convention. Nashville, April 21-24 — Contact: EFTA, Alexandria, Va. (703) 548-9600.

Software Maintenance Annual Meeting & Conference. Philadelphia, April 21-24 — Contact: Robin Gross (707) 843-4423.

Computer Law Conference. Washington, D.C., April 22-23 — Contact: Barbara Fleser, Computer Law Association, Fairfax, Va. (703) 560-7747.

Decision Support and Executive Information Systems: A Managerial Perspective. Cambridge, Mass., April 22-23 — Contact: Decision Support Technology, Cambridge, Mass. (617) 354-6600.

APICS 1991 Manufacturing Principles and Practices Seminar. Orlando, Fla., April 22-24 — Contact: APICS, Falls Church, Va. (703) 237-8344.

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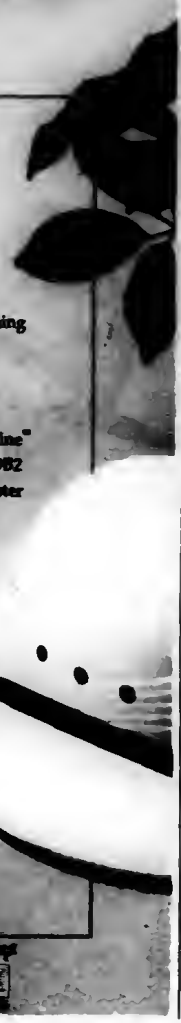

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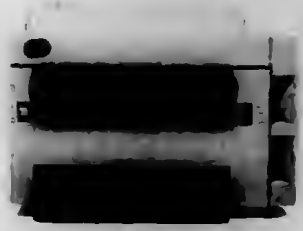

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BOOK REVIEW

Playing the game of international power in a new Europe

EUROPE 1992 & THE NEW WORLD POWER GAME
By Michael Silva and Bertil Sjogren
John Wiley & Sons, $22.95

In *Europe 1992 & the New World Power Game*, authors Michael Silva and Bertil Sjogren talk about the hazards of a world that sometimes seems set on fast forward: Technology is outdated in 18 months; books can be rendered obsolete by the time they come to market.

Unfortunately, *Europe 1992* suffers in some part from this problem. But although world events have conspired to make some of the predictions in this 300-page book outdated, the basic premise remains interesting, if somewhat speculative.

Silva, author and lecturer on global management, and Sjogren, a European-based management consultant, use 1992 as a reference point to track significant world events and explain where they think the world is headed. They have peppered the book with anecdotes and examples to bolster their points.

The authors create a scenario in which the opening of the Eastern Bloc countries leads the way to a gradual repudiation of communism and the embracing of capitalist methodologies worldwide. This will usher in the Age of Consumption, during which economic, rather than military, strength will be used to wage a trade war for superiority in the world market.

"The race toward 1992 promises to make techno-competition a harsh reality," the authors state.

When the European Community (EC) emerges in the 1990s as a unified economic bloc with a gross national product of $4 trillion, the potential of an instant new competitor will change the balance of power for the current economic stalwarts, the U.S. and Japan, according to the book.

What Silva and Sjogren see developing is a triad of powerhouses based on the EC's unification, a resurgent U.S. and a falling of Japanese trade barriers. "The role of the EC is that of a competing techno-center to the U.S. and Japan," the authors explain.

Spurred by Eastern Europe and the Soviet Union, which are counting on the unified EC to help them technologically, the authors see the need for the EC to create, not just ride, "the technowave of the '90s."

However, the authors' conclusions may be based on too many what-if scenarios to convince the reader.

For example, the authors predict that the Japanese, who export more than they import, will be forced to open their borders to foreign trade or bypass a potential EC market of 320 million consumers.

They envision the growth of worldwide consortia, sparked by a desire to become entrenched in as many countries as possible to avoid trading penalties imposed by reciprocity problems and to spread research and development and fixed costs across the broadest possible market. Consortia, the authors predict, will work in favor of the EC and the U.S., which are about 15 to 20 years ahead of the Japanese in the multinational buyout game.

The authors also postulate a cozier U.S./EC relationship on the basis of shared culture. One would think that in a truly global market, however, business decisions would not be affected by mutual ancestors.

However, the authors do make some interesting points: Our history with Europe goes back further than with Japan. What's more, while the Japanese have succeeded in dominating our markets for cameras, electronics and cars, they have not succeeded in importing their culture. American status symbols tend to be European: French wines, Swiss watches and Italian leathers.

Easier said than done

The prediction of a resurgent U.S. causes the most skepticism. The authors see the U.S. entering a period of "extroversion" — a prosperous phase of trading globally rather than concentrating on domestic turmoil.

However, this will happen only if the U.S. can "completely overhaul its education system and eliminate the federal deficit." A rather tall order, particularly when you consider that the cost of the Gulf war is just now being tabulated.

Of course, given the following paragraph from the book, this entire scene may never come to pass:

"How well a nation fares in the trade battle will determine how much it can afford to spend on defending its world position. It also poses the risk that a major country will play poorly and, in desperation or perhaps because of pride, resort to the old game of military power and make the notion of consumerism, not to mention the human race, obsolete."

Uncle Sam, I hope your ears are burning.

CAROL HILDEBRAND

Hildebrand is a Computerworld staff writer.

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Hardware Requirements: IBM PC, XT, AT, PS/2 or compatibles. PC/MS DOS 2.0 or higher with hard disk and min. 640K RAM. Project Workbench is a registered trademark and the ABT logo is a trademark of Applied Business Technology Corporation

PROJECT MANAGEMENT SOFTWARE

No hard hats or slide rules required

Products adapt to special needs of systems builders

BY ALLEN G. TAYLOR

What do information systems professionals have in common with construction supervisors and engineers? For one thing, they both plan and work on large, complex projects. This does not necessarily mean, however, that they have the same taste in project management software.

The roots of project management software are not embedded in IS but rather in the aerospace, engineering and construction fields. During the past couple of years, however, software development has become one of the largest portions of the project management software market.

For personal computer-based products alone, IS accounted for 15.7% of project management software shipped in 1989, according to International Data Corp. in Framingham, Mass., followed by construction at 12.5% and aerospace/defense at 12.3%.

One reason for this upswing in interest is pressure to curtail what is a high incidence of failed software projects, says Rich Julius, technical editor at the Center for Project Management in San Ramon, Calif.

Geared to IS

In response, many vendors have begun to market their packages or individual modules as catering to IS concerns.

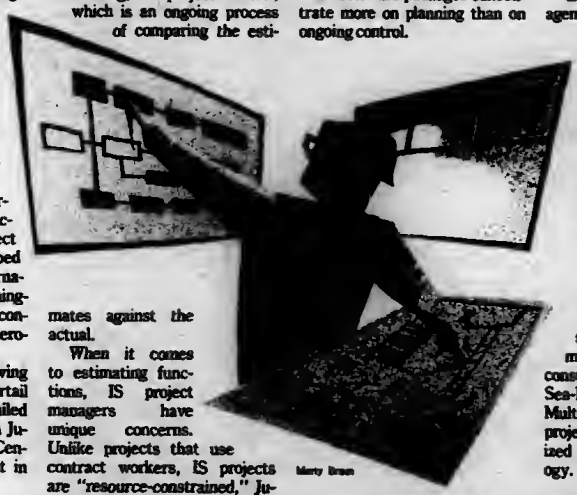
In some instances, the vendor simply provides training materials geared more toward programming concerns than building skyscrapers, for instance.

In others, vendors emphasize features in their general-purpose software that IS may find especially important.

"One of the major indications that a package is designed for IS users is how it can handle resources," says Daniel Yahdav, president of 1 Soft Decision, Inc., a project management consulting firm in San Rafael, Calif.

The typical project management package offers three basic functions:

- Estimating, including the effort required to complete the project as well as the project's duration and cost.
- Scheduling people and other resources, such as hardware and software, according to several calendars.
- Tracking, or project control, which is an ongoing process of comparing the estimates against the actual.



Marty Braun

When it comes to estimating functions, IS project managers have unique concerns. Unlike projects that use contract workers, IS projects are "resource-constrained," Julius says; that is, the programming team is finite. In addition, Yahdav continues, programmers are dedicated resources; it's not easy to "sub in" one for another.

Accordingly, many vendors have started to offer automatic resource-leveling, which reschedules activities to reflect known resource constraints.

Their very nature makes software development projects difficult to schedule accurately. There are fewer standards, such as in automotive repair, for example, for which a mechanic can check a book for a time estimate.

Rather than agonizing over the advance plan, many managers say they prefer to get started and adjust to events as they occur. Accordingly, control features are more valuable to them than scheduling. The problem is, most available project management software packages concentrate more on planning than on ongoing control.

Some IS-specific products, however, add a fourth function in hopes of overcoming that problem. These packages set up a methodology with standards such as programming tasks to be performed and how long they should take.

The Center for Project Management offers Projectbase, a PC-based front end that provides only the methodology and is intended to feed into many of the project management packages available today.

On the opposite end of the spectrum, Yahdav says, Applied Business Technology Corp.'s Project Workbench was designed for software development and is a full-function package with scheduling and tracking features. A separate module, Project Bridge, provides the methodology.

In the middle is Poc-It Management Services, Inc., which offers an off-line methodology to be used with Micro-Man II, its scheduling and tracking system.

These packages are more expensive than their generic counterparts. "Probably more people use [Computer Associates International, Inc.'s] Superproject and [Symantec Corp.'s] Timeline than something like Poc-It," Yahdav says.

Multitrak Software Development Corp. offers similar functionality on the mainframe. Rich DiTaranti, a consulting systems analyst at Sea-Land Service, Inc., says Multitrak gives him control over project planning with a standardized methodology and terminology.

Three targets

There are actually three main user groups of project management software in IS: senior managers, project managers and the development team.

Senior managers need to view the project from a global perspective, with high-level concerns about where the project is going and when it will get there.

The development team sees the smaller picture. "They need to be able to update the records of the tasks they are working on and add new tasks," says Ralph Stow, a consultant at Cleveland Consulting Associates in Dallas.

Project managers need to plan, control and report on the progress of several projects. Time-sheet capabilities, often missing from general-purpose

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Taylor is a seminar speaker, writer and systems consultant based in Westminster, Calif.

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Days not Spent
Time saved is one way to prove payback of PC packages. Page 56.

Word Tools
A glossary can provide a head start to training. Page 57.

Product Guide
A comprehensive listing of recently shipped PC software. Page 60.

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packages, can help in this role. Rather than simply reporting on whether an activity was completed, time-sheeting allows the project manager to see how many man-hours were required to complete each project task.

Future benefits

There is an additional benefit to time sheets, Yahdav says. When the project is over, the statistics can be fed into a historical database to establish estimates on future projects.

Timesheet$ from Software Partners, Inc. in Palo Alto, Calif., does just that. It interfaces with several project management packages, such as Superproject, Timeline and, shortly, Yahdav says, Microsoft Corp.'s MS Project for Windows.

Ease of use is another important consideration for development teams and project managers. A mouse-driven graphical user interface is preferred over a command-driven interface or a forms-based system.

If PC-based project management systems are to satisfy the needs of companies with multiple large projects, however, they must have more than a friendly user interface.

"Ease of use is tied very much to functionality," DiTaranti says. One desired function is the ability to share resources across project boundaries.

"The first thing the software must allow is for resources to be applied across projects," says Harvey Levine, a principal at The Project Knowledge Group in Clifton Park, N.Y.

Some of the low-cost, lower functionality systems do not offer resource sharing, says William Duncan, president of Duncan Associates, a project management consulting firm in Lexington, Mass. This has caused some shops to move to larger, shared systems on either a mainframe-, minicomputer- or PC-based local-area network.

With a mainframe, "you can look at all the projects on-line and do resource allocation as well as resource leveling," says Bob Lynn, systems analyst at American President Cos. "You can also get cross-functional reports a lot easier than you can on a microcomputer."

However, you don't need a mainframe to perform resource sharing. Many people contend that PCs are plenty powerful enough for the number of projects IS would have to contend with. "Except for those people who require tremendous computer power and connectivity, the better products are available for microcomputer platforms right now," Levine says.

Cost is usually one reason people cite for choosing PCs. An unlimited license for a typical mainframe project management software package such as Multitrak, Metier Management Systems, Inc.'s Artemis and Primavera Systems, Inc.'s Project/2 can cost several hundred thousand-dollars, compared with several hundred dollars for a single-user license.

A PC LAN setup could approach the cost of a mainframe or minicomputer system, however. A four-user Project Software and Development, Inc.'s Quiknet license costs about $18,000 on a VAX or about $1,500 per seat, Duncan says.

Some functions can be performed only on a powerful, centralized platform. DiTaranti cites several facilities that are unavailable on PC-based packages, including centralized time reporting by resource, comments attached to activities and multilevel project planning.

Take two

One solution to the debate over whether PCs or mainframes make better hosts for project management software is to use both. Many traditional mainframe firms such as Metier, Multitrak and Primavera offer PC-based packages or interfaces to import information from ones already on the market.

The information from many projects can then be rolled up to the mainframe and consolidated there to give senior management the overview they need.

Whichever approach you choose, says David Shaw, president of Constell Group, a consulting firm in Tenafly, N.J., the most important consideration is to have a consistent management process across the whole organization.

The software needs to reflect, as much as possible, the customer's preexisting management process and take into account the requirements of all groups involved in the management of the project. •

Early project delivery can justify initial cost

BY ROBB WARE

You would expect to see some return on investment from purchasing a personal computer, equipping it with project management software and training project leaders to use the software. But what if you could recover the total implementation cost with your first project?

Information systems departments that shorten delivery time by 1½ weeks with this software can do just that.

Typical cost for a PC-based project management system

Item	Cost
Software (average)	$700
PC*	[illegible]
Software training	$1,000
[illegible]	[illegible]
[illegible]	[illegible]
Total	[illegible]

[illegible]

Source: Ware & Associates

CW Chart: Paul Mock

These conclusions are based on the assumption that the project management software is being used to solve a specific problem: late delivery of projects. In that case, the first step in doing a cost/benefit analysis is to figure the costs of implementation. Obvious costs are software and hardware, but another factor that is often overlooked is training (see chart).

Typically, IS project managers require two types of training: learning how to use the software and learning how to implement project management concepts such as task definition, dependency analysis, estimating techniques and effective use of Gantt and Program Evaluation and Review Technique charts.

Training in these important concepts takes about three days and can be offered by the vendor but is usually acquired from an independent consultant. The amount of time spent on training should also be included as a cost because that time can't be charged back to IS users. A typical amount of internal billing lost for training is 35 hours at $35 per hour, or $1,225.

You could write off these costs over several projects. For simplicity's sake, however, they are treated here as onetime costs.

The second step is to determine at what point project management software starts saving you money, relative to how early projects are delivered.

To do this, first calculate how much it costs to complete a typical project without project management software.

From our experience with many Fortune 1,000 companies, we conclude that an average IS project requires four people working on it for one year — four effort years.

Most companies calculate that the cost to the organization for an IS professional is approximately 2½ times the salary cost.

With a typical salary of $35,000 each, four effort years cost four times (2½ times $35,000), or $350,000. This is the average project cost. The daily cost of that project is $350,000 divided by 250 working days per year, or $1,400 per day.

If project management software can reduce delivery time, the benefit of any time reduction is equal to $1,400 per day, or $7,000 per week.

The effect of spending $9,425 for the software, hardware and training is offset by early project delivery. As the time savings moves beyond 1½ weeks, the cost savings grows even more.

The penalty for untimely delivery of mandatory projects is not included in this calculation because it's difficult to measure. For example, how do you explain to your state comptroller that your company will be unable to implement the state's new tax package on the mandatory date?

It is important to note that performing a cost/benefit analysis for mainframe project management systems is much more complex than doing one for a PC-based system. This is because mainframe packages typically perform a wide variety of functions, including scheduling, time tracking and accounting. •

The break-even point

If you spend $9,435 on a PC-based project management system and your average project cost per week is $7,000, you can completely recoup your investment in the project management software if you deliver your first project 1½ weeks earlier than you would have without the software.

Ware is president of Ware Associates, a consulting and project management training company in Groton, Conn.

Peer groups

The following associations and consortiums offer publications, seminars and other project management support to their members:

• **Boston University Center for Project Management**
72 Tyng Road, Tyngsboro, Mass. 01879
Contact: Dennis Moriarty, Director of Corporate Relations
(508) 649-9731 or (800) 733-3593

The center holds monthly meetings, two annual conferences in Boston and San Francisco and an annual membership roundtable. Fifteen courses are offered, in addition to a nine-month Project Management Certification program. A software simulation package for training is also available. The center publishes a newsletter called "Critical Paths." The membership fee is $15,000 per year for corporations.

• **The Center for Project Management**
Suite 290, 18 Crow Canyon Court, San Ramon, Calif. 94583
Contact: Rich Julius, Technical Editor
(415) 837-0397

The center's activities include program and project management consulting, research, publications and training seminars. The center also publishes the Projectguide Resource Library (IS standards, procedures and guidelines) and specializes in custom-designed development methodologies and their implementation.

• **Project Management Consortium**
Sponsored by The Center for Project Management (see previous listing)

The consortium is part of an industrywide effort to share and refine a professional IS knowledge base. Member organizations receive access to Project Central (a tactical methodology office and IS information center), research archives, life cycle and task effort data, standards publications and project management training seminars.

Annual membership is available at three levels: Charter ($25,000 fee), Full ($20,000) and Associate ($4,000). Benefits vary according to membership level.

• **Project Management Institute (PMI)**
P.O. Box 43, Drexel Hill, Pa. 19026
Contact: Jeanna Flaherty, Marketing Manager
(215) 622-1796

The institute is a nonprofit professional association dedicated to raising the level of excellence in project management through research, monthly periodicals, local chapter membership in North America, Europe and Africa, handbooks and Project Management Professional certification.

The institute has established an Information Systems Special Interest Group and will be presenting a special meeting and technical track devoted to IS project management at the 1991 PMI Annual Seminar/Symposium in Dallas Sept. 28-Oct. 2.

PMI also has a listing of vendors and consultants involved in project management.

Glossary

- **Baseline:** The original plan, plus or minus changes made as a result of changes in scope. It is the standard against which project or program performance is measured.
- **Cost performance index:** The ratio of budgeted to actual costs, which is used to predict the magnitude of a possible cost overrun.
- **Critical path method:** A technique used in project scheduling to determine which activities are most likely to result in an overall project delay. The "critical path" consists of those activities that must be completed on time for the project as a whole to be completed on time. Critical path activities have zero float.

- **Earned value analysis:** A method of measuring project performance. It compares the amount of work that was planned with what was actually accomplished to determine if the project is on schedule and within budget.
- **Float:** The amount of time a task can be delayed before an entire project is delayed. A task with float means that a slight delay in starting will not jeopardize project deadlines.
- **Gantt chart:** A graphics display of activity durations. In the typical Gantt chart, activities are listed down the left side of the chart and dates across the top. The durations of individual activities are shown as horizontal bars.
- **Multiproject analysis:** The process of planning or scheduling more than one discrete project simultaneously from a single pool of resources.
- **Program Evaluation and Review Technique (PERT) chart:** A PERT chart graphically illustrates the relationships and interdependencies among tasks by means of boxes and adjoining lines.
- **Project linking:** The program can temporarily treat several projects like one large project. Multiple supervisors can maintain project files independently, while the manager can easily consolidate current information from all of the projects.
- **Resource leveling.** Scheduling or rescheduling project activities based on resource availability. Resource leveling can be time-constrained (reschedule activities to minimize resource use but not at the cost of delaying the schedule) or resource-constrained (reschedule activities to reflect known resource constraints).
- **Work breakdown structure:** A hierarchical method of scheduling that divides a project into sections consisting of related tasks, usually constructed in either an outline form or as a flow diagram. The purpose of the work breakdown structure is to provide reviewable input for the planning, scheduling and control phases of the project.

Definitions provided by Duncan Associates, Datapro Research Group and Software Digest.

Project hot line: Five most commonly asked questions

The following are some of the questions most frequently asked by potential users of project management software, according to William Duncan, head of Duncan Associates, an international project management consulting and training firm in Lexington, Mass. Duncan is a certified project management professional, co-chairman of the Standards Committee of the Project Management Institute and a member of the Editorial Review Board of the Project Management Journal.

Q How do we decide which product is right for us?

A The simple answer is to define your requirements and use those requirements to evaluate the hundreds of products available. If you have difficulty with that, you can either hire a consultant or buy a copy of a popular, modestly priced product and use it on a real project for several weeks.

If the software works adequately, you're all set. If not, you at least have a basis for evaluating other products without making a substantial investment.

If you choose this method, use a real copy of the software, not a demonstration. You need to use the product in a live environment to fully appreciate its strengths and weaknesses.

Q What are some important requirements often overlooked by people wanting to purchase project management software?

A One is multiple calendars. These allow you to handle vacations, holidays, sick days and different work styles simply and easily.

Another important feature is built-in planning vs. actual reporting. Without this feature, you have only a planning tool. This feature lets you manage your products through analyzing variances and taking corrective actions as well as just planning them.

Variable time periods are something else to consider. Look for a system that allows you to mix units on the same project so that you can plan in days and weeks and still report time hourly.

One last feature is interfaces. If you have a computer-aided software engineering tool, you'll want a product that will interface with it. Same if you have a local-area network. If you want a centralized system for your mainframe that will be fed by a personal computer-based product, get two that will work together without custom development.

Q What is the relationship between CASE and project management software?

A CASE tools support a project management methodology. Project management software helps to convert these strategies into an operational plan to guide the conduct of day-to-day project activities.

Q How much should we expect to pay?

A As a rule, you get what you pay for. The more expensive products generally have more and better features than the less expensive ones.

Be sure to comparison shop. Prices of products available through retail channels can vary by 20% to 30%. Most vendors will provide substantial discounts for bulk purchases.

Also, don't reject the mainframe- and minicomputer-based products just because of high per-copy costs, which can be $10,000 to $250,000 vs. $400 to $5,000 for PC products. On a per-seat basis, these products for mainframes and minicomputers are often quite competitive.

Q How long does new software take to get up and running?

A That is a function of how much time and energy you commit to training, but you should be able to use most systems within a few weeks. Real benefits will not likely be visible for several months. ●

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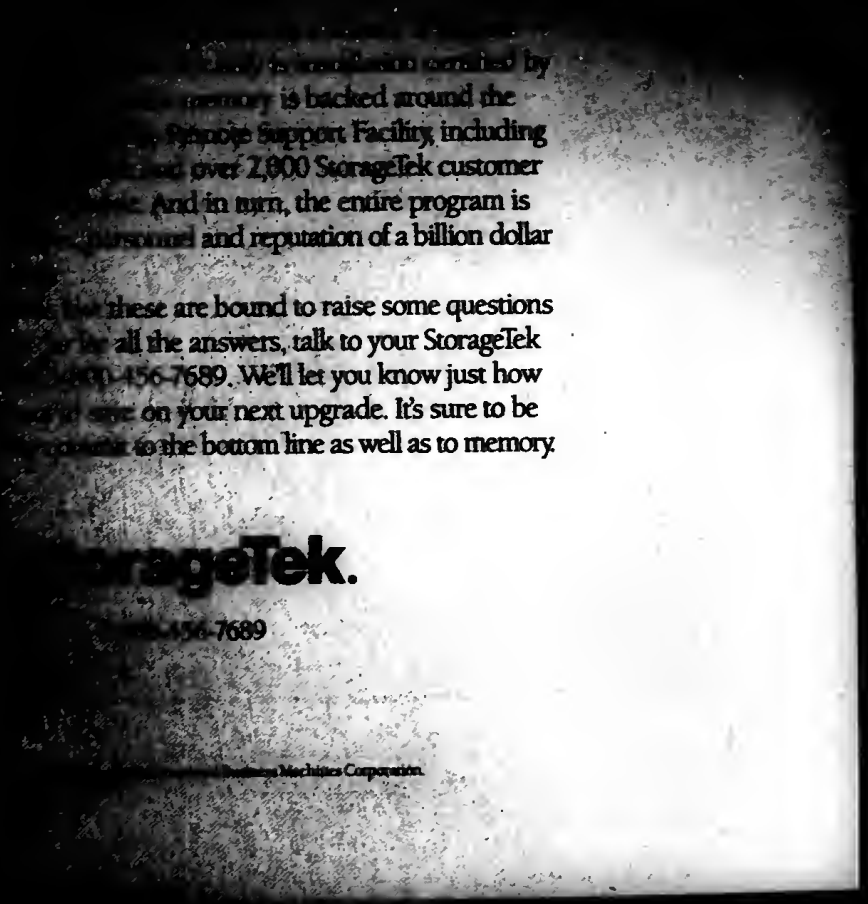

PC-based project management software[1]

VENDOR	PRODUCT	HARDWARE PLATFORM/ OPERATING SYSTEMS SUPPORTED	MEMORY/DISK REQUIREMENTS (IN BYTES)	FUNCTIONS	SCHEDULING FEATURES	INCREMENTS OF SCHEDULING	AUTOMATIC RESCHEDULING	MONITORING, CONTROL FUNCTIONS SUPPORTED	AVAILABLE CHARTS	NUMBER OF TASKS PER PROJECT	FILE FORMATS SUPPORTED[2]	USER INTERFACES SUPPORTED	PERIPHERALS SUPPORTED	BASE PRICE/MULTIUSER VERSION
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
AGS Management Systems, Inc. (215) 265-1600	Wang/PC Version 1.5.1	IBM PCs and compatibles/MS-DOS	454K - 468K/4M	Critical path calculation, project linking, scheduling, resource leveling, individual resource leveling, leveling over multiple projects	Backward scheduling, hammocking, multiple starts and finishes, loops identified and resolved interactively	Minutes, hours, days	Yes	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, logic diagram, time-scaled network diagram, histograms, earned value analysis, customized reports, cost tracking, bar charts, pie charts	2,000	ASCII	Menu-driven, command-driven	Color printer, Postscript, plotter, color displays	NA/$19,500 (four users)
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Applied Microsystems, Inc. (604) 883-0900 (604) 883-1387	Proteus Release 4.4	IBM PCs and compatibles/MS-DOS	512K/third disk recommended	Project linking, scheduling	Scheduling done on individual projects	Days, weeks	Yes	Baseline comparisons, percent complete	Gantt, customized reports	2,000	ASCII (export only), Dbase (export only)	Menu-driven, dialog boxes	Color displays	$79.95
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Center for Project Management (415) 577-0557	Projectware Version 4.0	IBM PCs and compatibles/DOS 2.10 or higher	320K - 700K/400K recommended	Critical path calculation, planning and estimating, life cycle management	Exports plans and estimates to scheduling software	NA	NA	Task effort baselines, resource profiling	Customized reports, potential PERT	512	ASCII, Dbase, Timeline, Superproject, Qwiknet, Project Workbench, Viewpoint, Microsoft Project (all export only)	Menu-driven, command-driven, dialog boxes	Color displays	$2,950 (for all four modules)/NA
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Computer Associates International, Inc. (516) 432-1727	Superproject Version 2.0	IBM PCs and compatibles/DOS	630K/3M, hard disk required	Critical path calculation, project linking, scheduling, resource leveling, individual resource leveling, leveling over multiple projects, leveling by priority, leveling using overtime	Backward scheduling, hammocking, multiple starts and finishes, loops identified and resolved interactively, split resource, auto actuals	Minutes, hours, days, weeks, months, years	Yes	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, logic diagram, time-scaled network diagram, histograms, earned value analysis, cost tracking, work breakdown, calendars	Limited by RAM only	ASCII, Dbase, Lotus' 1-2-3, proprietary Superask 5, Excel	Menu-driven, dialog boxes	Color printer, Postscript, plotter, color displays, mouse, laser graphics	$695/$695 (three users)
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Diversified Information Services, Inc. (516) 996-7205	Time Machine	IBM PCs and compatibles/MS-DOS	640K/2M	Critical path calculation, scheduling, resource leveling, individual resource leveling	Backward scheduling, hammocking	Hours, days, weeks, months	No	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, logic diagram, time-scaled PERT, time-scaled network diagram, histograms, earned value analysis, customized reports, cost tracking	10,000	ASCII, Dbase, Lotus' 1-2-3	Menu-driven	Plotter, color displays	$4,500/NP
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[1]Only products and new releases of older products that first shipped since January 1990 have been included in the survey. [2]Files are imported and exported unless otherwise noted.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

VENDOR	PRODUCT	HARDWARE PLATFORM/ OPERATING SYSTEMS SUPPORTED	MEMORY/DISK REQUIREMENTS (IN BYTES)	FUNCTIONS	SCHEDULING FEATURES	INCREMENTS OF SCHEDULING	AUTOMATIC RESCHEDULING	MONITORING, CONTROL FUNCTIONS SUPPORTED	AVAILABLE CHARTS	NUMBER OF TASKS PER PROJECT	FILE FORMATS SUPPORTED[1]	USER INTERFACES SUPPORTED	PERIPHERALS SUPPORTED	BASE PRICE/MULTIUSER VERSION
Mathsoy (818) 991-0620	Mir-schedule Macintosh Version 3.0, Mir-schedule PM+ Version 3.0	Macintosh family/Macintosh operating system	512K/HA	Scheduling	Earned value analysis	Minutes, hours, days, weeks, months, years	No	Earned value analysis, cost tracking	Gantt, earned value analysis	10*	Excel Import only	Mouse-driven, dialog boxes	Color plotter, mouse	$595, $995/NA
Mother Management Systems, Inc. (703) 222-1111	I/CSCS PC	IBM PCs and compatibles/DOS	512K/1M	Scheduling, project cost management, estimating	Integrates with scheduling software	Hours	No	Earned value analysis, baseline comparisons, cost tracking, percent complete, 11 methods of performance measurement	Histograms, earned value analysis, customized reports, cost tracking, structure drawings, government reports, responsibility assignment matrix, organization, cost breakdown structure	Limited by disk space only	ASCII, Dbase, Lotus' 1-2-3	Windows 2.11, 3.0, mouse-driven, dialog boxes	Color printer, plotter, color displays, mouse	$3,750/NA
	Prestige Version 4	IBM PCs and compatibles, PC LANs, Sun/DOS, Sun OS, Unix	640K/8M	Critical path calculation, project linking, scheduling, resource leveling, individual resource leveling, leveling over multiple projects	Backward scheduling, hammocking, multiple starts and finishes	Hours, days, weeks	No	Earned value analysis, baseline comparisons, percent complete	Gantt, logic diagram (display only), time-scaled PERT (display only), time-scaled network diagram (display only), histograms, earned value analysis, customized reports, cost tracking	4,000, 30,000 (with extra memory)	ASCII, Lotus' 1-2-3, Artemis	Menu-driven	Postscript, plotter, color displays	$3,995/ $4,995 plus $3,995 per user
	Artemis Planner Version 2	IBM PCs and compatibles/DOS	512K/1M	Scheduling, rough cut planning, bar chart drawing	None, bar chart drawing system	Days, weeks, months	No	Baseline comparisons, percent complete	Gantt, logic diagram (display only), logical bar charts (display only)	Limited by disk space only	ASCII, Artemis	Proprietary graphical user interface, menu-driven	Color printer, plotter, color displays, mouse	$995/NA
	Artemis 7000-386	IBM PCs and compatibles, Unix platforms/DOS, Unix	1M/7M	Critical path calculation, project linking, scheduling, resource leveling, individual resource leveling, leveling user multiple projects	Hammocking, multiple starts and finishes	Minutes, hours, days, weeks, months, quarters, years	Yes	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, logic diagram, time-scaled PERT, time-scaled network diagram, histograms, earned value analysis, customized reports, cost tracking, work breakdown structure, organization breakdown structure, time-scaled bar charts, symbol drawings, logic bar charts	Limited by disk space only	ASCII, Dbase, Lotus' 1-2-3, Timeline, Artemis	Menu-driven, mouse-driven, command-driven	Color printer, plotter, color displays, mouse	$6,000/ $22,000 (five users)
	Artemis Project Version 3.0	Intel 80386-based PCs, Unix platforms/DOS, Unix	1M/8M	Critical path calculation, project linking, scheduling, resource leveling, individual resource leveling, leveling user multiple projects	Backward scheduling, hammocking, multiple starts and finishes, loops identified and resolved interactively	Hours, days, weeks, years	No	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, logic diagram, time-scaled network diagram, histograms, earned value analysis, customized reports, cost tracking	1M	ASCII, Lotus' 1-2-3, Timeline, DIF, Artemis	Menu-driven	Plotter, color displays, mouse	$3,200/ $2,600 per user
Hilton Planning International (410) 880-9434	Micro Planner	IBM PCs and compatibles/PC-DOS 2.0	512K-640K/Hard disk required	Critical path scheduling, scheduling, resource leveling, individual resource leveling, leveling over multiple projects	Backward scheduling, hammocking, multiple starts and finishes, loops identified and resolved interactively	Days, weeks	Yes	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, PERT, logic diagram, histograms, earned value analysis, cost tracking	1,384	ASCII, Dbase (import only), Lotus' 1-2-3 (import only)	Windows 2.0, mouse-driven	Color printer, Postscript, plotter, color displays, mouse	Shareware (network ready)
Micro Research Systems Corp. (514) 487-2275	Project/I-80 Version 4	IBM PCs and compatibles/MS-DOS 3.3 and higher	512K/Hard disk required	Critical path calculation, scheduling, resource leveling, individual resource leveling, cost analysis, program control	Hammocking, loops identified and resolved interactively	Days, weeks	Yes	Baseline comparisons, cost tracking, percent complete	Gantt, logic diagram, time-scaled PERT, cost tracking, histograms (display only), time-scaled network diagram (print only). Autocad interface	2,000	ASCII	Proprietary graphical user interface, menu-driven, command-driven, CASE tools, batch file	Color printer, plotter, color displays, mouse	$498/NA
[redacted]														
Monitor Systems, Inc. (415) 949-1688	Task Monitor	Macintosh, IBM PCs and compatibles/DOS, Macintosh operating system	640K/Hard disk required	Critical path calculation, project linking, scheduling, resource leveling, individual resource leveling, leveling over multiple projects	Backward scheduling, hammocking, loops identified and resolved interactively	Days, weeks, years	Yes	Earned value analysis, baseline comparisons, cost tracking, percent complete, other performance measures	Gantt, logic diagram, time-scaled PERT, time-scaled network diagram, earned value analysis (print only), customized reports, cost tracking	Limited by disk space only	ASCII, Lotus' 1-2-3, Artemis Project 2, Xtree	Mouse-driven, dialog boxes	Color printer, mouse (Macintosh only), plotter, color displays	$995/$695 (two to three users)
[redacted]														
Pathfinder, Inc. (800) 424-7100	Star*Watch	IBM PCs and compatibles/DOS 3.1 or higher	512K/Hard disk and floppy combination required	Critical path calculation, project linking, scheduling, resource leveling, individual resource leveling, leveling over multiple projects, work breakdown structure, forms and works, technical work packages, supports purchase order and vendor tracking	Backward scheduling, hammocking, multiple starts and finishes, loops identified and resolved interactively, ADM/PDM bar charts on screen	Days, weeks, months (can also be defined by user	Yes	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, time-scaled PERT, time-scaled network diagram, earned value analysis, customized reports, cost tracking, logic diagram (print only)	1,000	ASCII, Lotus' 1-2-3	Mouse-driven, command-driven, dialog boxes	Plotter, color displays	$1,500/ $20,000 (five students with server); tuition discounts available
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VENDOR	PRODUCT	HARDWARE PLATFORM/ OPERATING SYSTEMS SUPPORTED	MEMORY/DISK REQUIREMENTS (IN BYTES)	FUNCTIONS	SCHEDULING FEATURES	INCREMENTS OF SCHEDULING	AUTOMATIC RESCHEDULING	MONITORING, CONTROL FUNCTIONS SUPPORTED	AVAILABLE CHARTS	NUMBER OF TASKS PER PROJECT	FILE FORMATS SUPPORTED[1]	USER INTERFACES SUPPORTED	PERIPHERALS SUPPORTED	BASE PRICE/MULTIUSER VERSION
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Power Up Software Corp. (415) 546-6060	Quick Schedule Plus Version 2.1	IBM PCs and compatibles/DOS 2.0 or higher	512K-640K/hard disk or floppy configuration required	Scheduling	Multiple starts and finishes	Minutes, hours, days, weeks, years	No	None	Gantt	500	ASCII(export only)	Proprietary graphical user interface, dialog boxes	Color displays	$99.95/NA
[illegible]	[illegible]	[illegible]	[illegible]	Critical path calculation, scheduling	Backward scheduling, multiple starts and finishes	Days	Yes	Earned value analysis, cost tracking	Gantt, logic diagram, time-scaled network diagram, earned value analysis, customized reports, cost tracking	4,000	ASCII, Dbase, Lotus' 1-2-3, Project Plus	[illegible]	Color printer, Postscript, plotter, color displays, mouse	$795/NA
Project Software & Development, Inc. (617) 661-1444	Quiknet Professional Release 2.0	IBM PCs and compatibles/PC-DOS, MS-DOS 2.0 or higher	640K/hard disk required	Critical path calculation, project linking, scheduling, resource leveling, leveling over multiple projects	Multiple starts and finishes, loops identified and resolved interactively	Minutes, hours, days, weeks, months	Yes	Earned value analysis, baseline comparisons, cost tracking, estimate to complete, budget and variance to date, at completion variance, schedule and cost variance	Gantt, logic Gantt (display only), logic diagram, histograms, earned value analysis, customized reports, cost tracking; work breakdown structure plots (print only)	5,000 per project or multi-project	ASCII, Dbase (import only), Lotus' 1-2-3 (export only), Project/2	Proprietary graphical user interface, graphical drawing board, menu-driven, screen, windows	Color printer, Postscript, plotter, color displays, mouse	$2,500/ $8,600 (four users)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SAS Institute, Inc. (919) 677-8000	The SAS Application System Release 6.04 (PC-DOS), Release 6.06 (OS/2)	IBM PCs and compatibles/PC-DOS, MS-DOS, OS/2	640K/20M	Critical path calculation, scheduling	Backward scheduling, hammocking, multiple starts and finishes	Seconds, minutes, hours, days, weeks, years	Yes	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, logic diagram, histograms, earned value analysis, customized reports, cost tracking	Limited by disk space only	ASCII	Proprietary graphical user interface, Presentation Manager, menu-driven, command driven, dialog boxes	Color printer, plotter, color displays, mouse	$1,070 (DOS), $1,450 (OS/2)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Software Publishing Corp. (415) 962-8910	Harvard Project Manager Release 3.03	IBM PCs and compatibles/DOS 2.1 or higher	640K/Hard disk required	Critical path calculation, scheduling, resource leveling, leveling user multiple projects	Backward scheduling, loops identified and resolved interactively	Minutes, hours, days, weeks, years	Yes	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, logic diagram, time-scaled PERT, time-scaled network diagram, histograms, earned value analysis (print only), customized reports, cost tracking (display only)	500	ASCII, Dbase, Lotus' 1-2-3, Timeline 2 (task information only)	Proprietary graphical user interface, menu-driven, dialog boxes	Color printer, plotter, color displays	$695/NA
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Symantec Corp. (408) 253-9600	Timeline Version 4.0	IBM PCs and compatibles/PC-DOS, MS-DOS 3.0 or higher	640K/Hard disk required	Critical path calculation, project linking, scheduling, resource leveling, individual resource leveling, leveling over multiple projects when combined into one schedule, linking of schedules	Backward scheduling, hammocking, multiple starts and finishes, loops identified and resolved interactively, effort-driven tasks	Minutes, hours, days, weeks, months	Yes	Earned value analysis, baseline comparisons, cost tracking, percent complete	Gantt, logic diagram, time-scaled PERT (print only), time-scaled network diagram (print only), histograms, earned value analysis, customized reports, cost tracking, periodic PERT, outline PERT, Tree chart (display only)	1,000 - 3,000, limited by memory only	ASCII, Dbase, Lotus' 1-2-3, Excel, Artemis	Proprietary graphical user interface, menu-driven, command-driven, dialog boxes	Color printer, Postscript, plotter, color displays, mouse, slide production device	$495/$595 per simultaneous user pack
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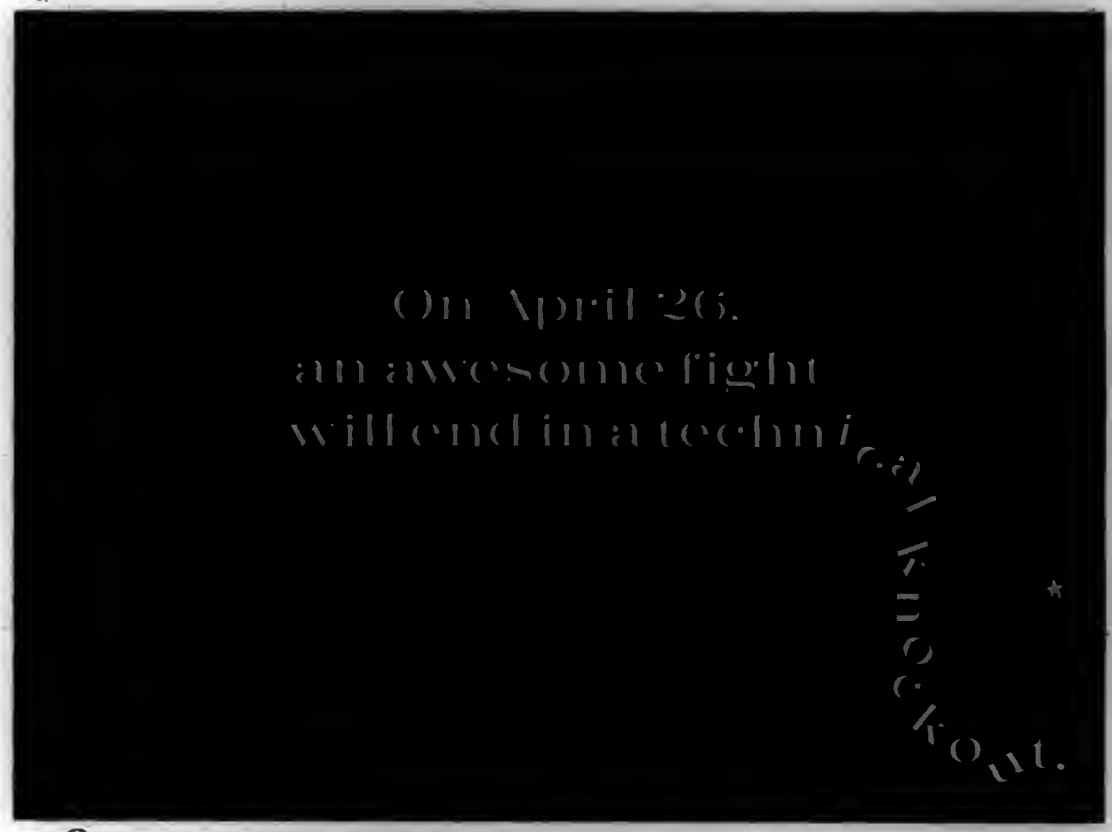

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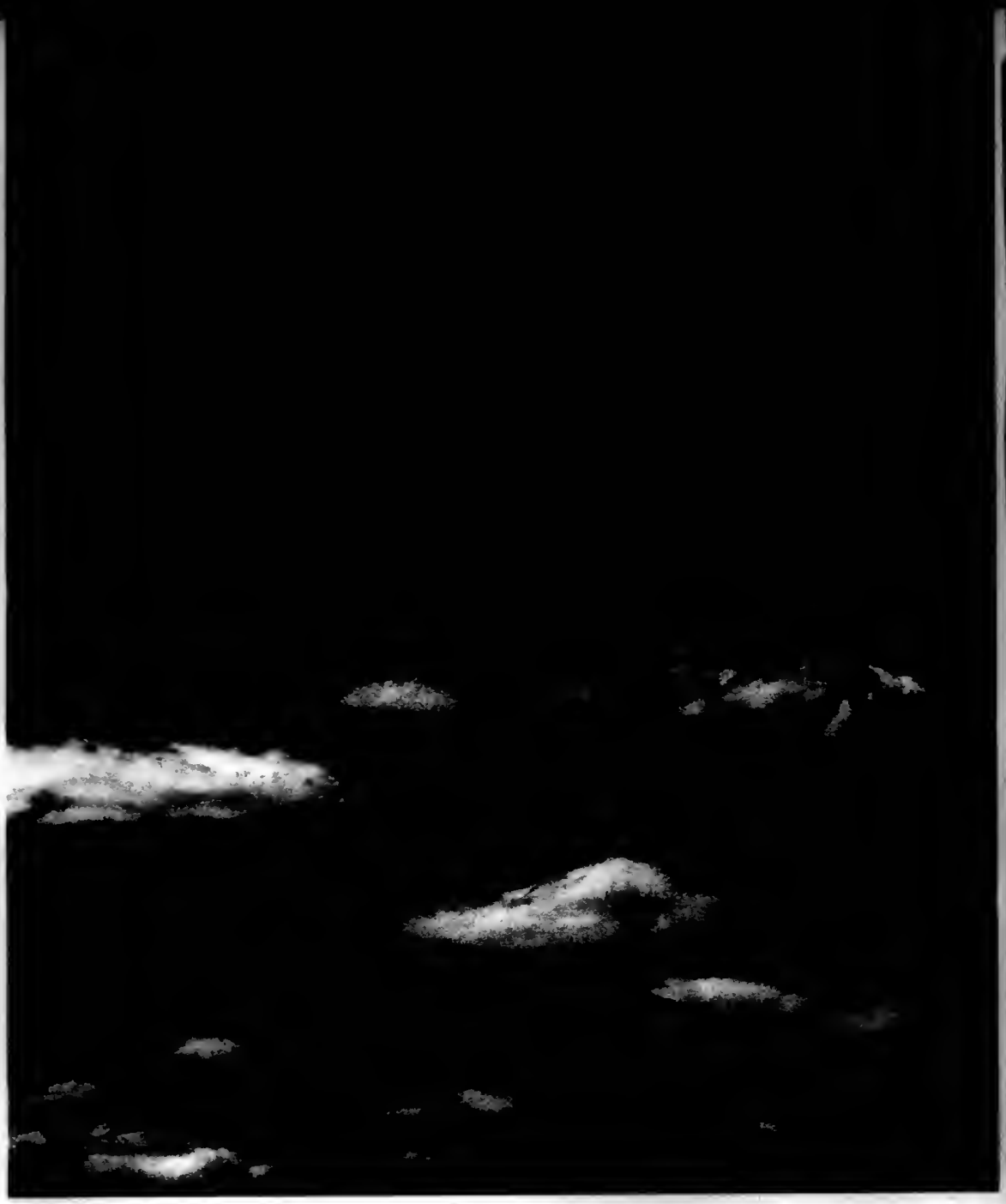

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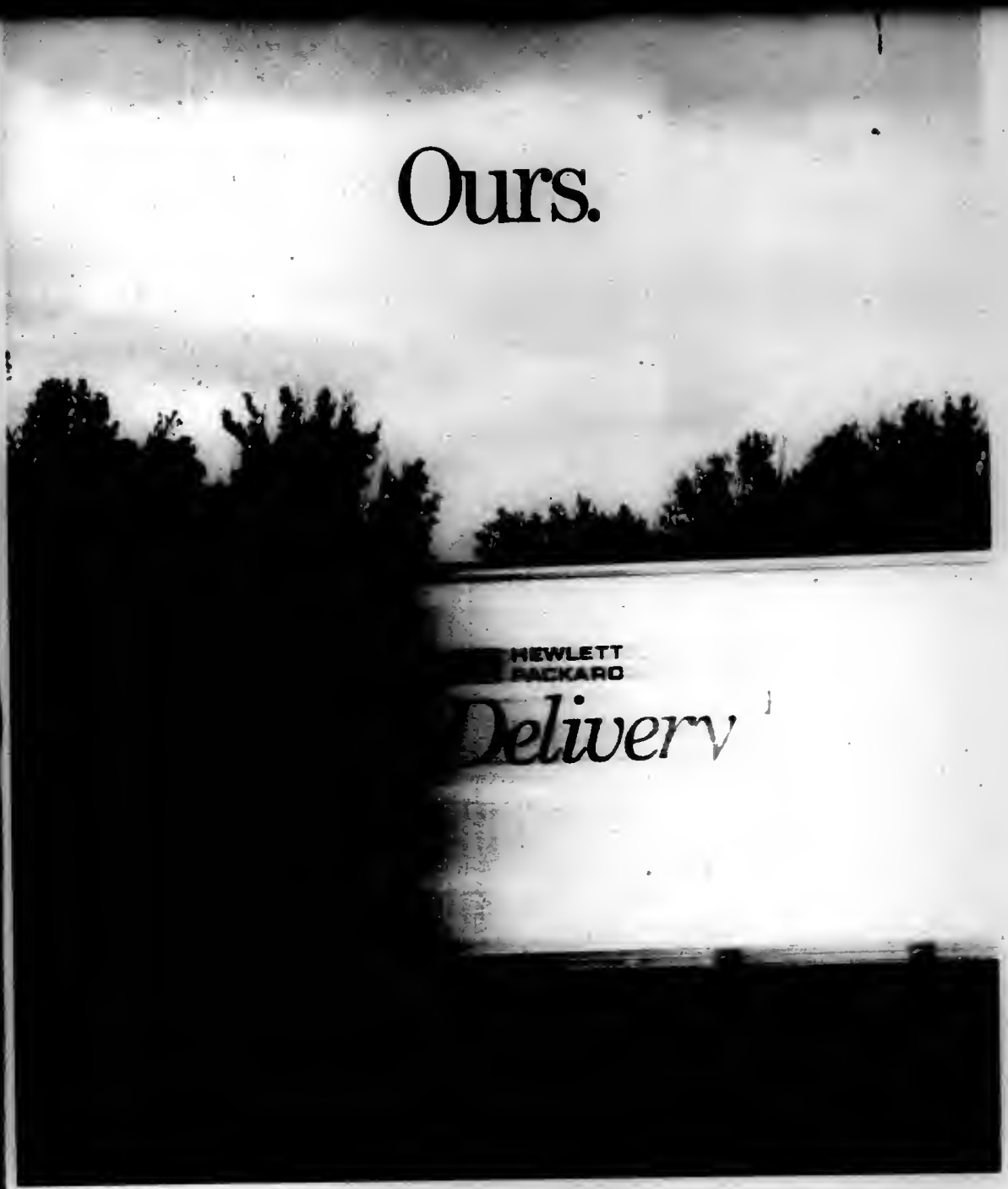

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Fuzzy logic clarified

Concept brings imprecise nature of human thought to business applications

BY EARL COX and MARTIN GOETZ

James Endicott

Fuzzy reasoning doesn't sound like something the information systems community should be striving to achieve. After all, bookstores and catalogs are full of tools to help us think more clearly, straightforwardly and objectively. We've spent our careers attempting to bring a high level of Boolean precision into our computerized applications.

Yet fuzzy, or imprecise, reasoning, a technology based on a form of mathematics called fuzzy logic, may offer a solution to applications development bugaboos. The incorporation of fuzzy logic into existing or new mission-critical applications enables them to be more quickly developed. Additionally, fuzzy logic enables IS to build a new class of applications previously deemed unfit for automation because of imprecise parameters.

Particularly good fuzzy logic candidates include insurance and financial risk assessment applications that contain a large number of variables and decision-making input from experts. With fuzzy logic, for example, IS can enable users to query "good" or "bad" insurance risks without having to provide the computer with a plethora of detailed conditional statements.

Fuzzy reasoning has the potential today to embed into computers software logic that more closely parallels how people and experts think.

Because fuzzy logic works on general-purpose machines, preparing for this technology doesn't require massive systems changes. Rather, the changes that need to occur must happen in the IS mind-set. We must examine and alter some basic applications development precepts.

We have always been taught that the computer was designed to make decisions based on specific values. "If A is greater than or less than five, do B." IS personnel have had to learn to think like computers to build effective systems.

However, in life, business included, most decisions are not based on "crisp" — or absolute — values. Rather, decisions are based on imprecise information, which limits the extent to which they can be supported through automation. Inexact terms such as "high," "low," "few" and "many" have until now had no place in IS applications; computers could not understand these concepts.

Fuzzy logic, first described in 1965 by Lotfi A. Zadeh, a professor at the University of California at Berkeley, has the potential to change all that by letting computers think like we do. It will enable general-purpose machines to process imprecise data through new, more human-like languages.

A look at fuzzy set theory

Because fuzzy logic is a recent concept, understanding its potential requires some introduction to fuzzy set theory — the mathematical notion that an element may have partial membership in a set (see story page 70).

For example, consider the concept of

Continued on page 70

Cox is founder and chief scientist at Knowledge Based Technologies, Inc. in White Plains, N.Y., an expert systems and fuzzy logic software company. Goetz is president of Goetz Associates, a management consulting company in Teaneck, N.J., and founder of Applied Data Research. In 1989, he was inducted into the Infomart Computer Hall of Fame.

Words & Terms

Approximate reasoning: A reasoning or inference process that incorporates fuzzy sets and hedges.

Crisp set: A mathematical set with sharp boundary points (e.g., 6 ft is TALL but 5 ft 11½ in. is NOT TALL); the traditional definition of a set in classical or symbolic logic.

Fuzzy logic: A generalization of the mathematical concept of set membership in which, unlike traditional Boolean logic that requires a yes/no type of response (see crisp set), an element may have only partial membership in the set.

Fuzzy set: A conceptual representation of a set that permits an element to have gradual degrees of (or partial) membership in a set.

Hedges: Transforming language that modifies the shape of a fuzzy set by intensifying ("very"), diluting ("somewhat") or reversing ("not") the membership profile.

Linguistic variables: Semantic concepts (such as "high" or "low") that lend perspective and give reference to a fuzzy set.

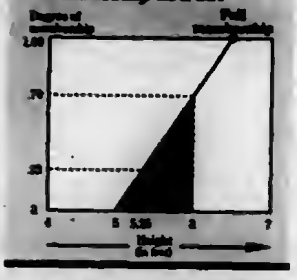
Membership in a fuzzy set: A value between 0 and 1 that indicates the degree to which an element has membership in the set. At 0, the element has no membership; at 1, it has full membership.

Continued from page 69

tall American males. What values of the variable "height" should be considered tall? Classical mathematical set theory would require an inclusive membership function. In other words, we might simply dictate that anyone over 6½ feet is tall.

However, in real life, the range of heights considered to be tall is not well-defined. While most of us recognize anyone over 7 feet as tall and someone under 5 feet as short, what about people who are 5 ft 11 in. or 6 ft 2 in. or 6 ft 6 in.? Our appreciation for tall increases as the value of height increases.

Diagram A: The degree of membership in a set



Therefore, we can say that tall is not "crisp" or sharply defined. This concept of tall is, in fact, a fuzzy set.

The degree or grade of membership in a fuzzy set is marked off on a graph between the values of 0 and 1. In our tall example, 0 would represent extremely short, 1 extremely tall.

Mapping a scalar value into the tall set's horizontal axis (see Diagram A above) produces the "truth" or "compatibility index value," a number between 0 and 1 showing the degree to which the object is part of the fuzzy set.

By looking at the diagram, we can see that a person who is 4 feet is not tall because the degree of membership, or truth, on the scale is 0.

But someone who is 5 ft 3 in. in height has a moderate degree of tall with a compatibility of 0.23, and someone who is 6 feet in height has a greater degree of tall with a compatibility of 0.70. Anyone over 6½ feet is absolutely tall.

The shape of a fuzzy set determines its membership characteristics. Take, for example, the concept of middle-age. This concept can be stated as: AGE IS AROUND 40.

Whereas in a crisp set, the definition of middle-age would be people over 30 and under 50, inclusive, fuzzy sets offer us a better method of describing middle-age by representing the surface as a symmetrical, bell-shaped curve (see Diagram B).

When the variable age is mapped to the fuzzy set middle-age, its membership increases as age approaches 40 years old — the absolute membership in the set.

As age increases beyond 40, the membership drops toward 0, indicating that while the individual may still be considered middle-aged, he is moving toward other fuzzy domains such as senior citizen or elderly.

Fuzzy logic also lets us take personal perceptions into account. For example, most people base their perception of the concept old on how old they are personally. To a 30-year-old, 30 is not very old, giving 30 a truth of about 0.25 when mapped out. With the same perspective, a 45-year-old is moderately old with a truth of about 0.55.

Personal semantics

When fuzzy sets such as tall and old are embedded in a sentence structure, we call them linguistic variables. We can use them, for example, to query a database to find people who are both tall and old. For example, one such query might be: SELECT EMPLOYEES WHERE HEIGHT IS TALL AND AGE IS OLD.

"Hedges" are used to modify linguistic variables. Hedges are words used to modify the shape of a fuzzy set's surface. They can approximate, intensify, dilute and reverse the membership profile. Approximate hedges, such as "about," "above" and "around," are used to transform crisp values into fuzzy sets. Intensify hedges, such as "very," and dilute hedges, such as "rather," shift the fuzzy set values to the left or right of the fuzzy set's surface. Reverse hedges, such as "not," change the fuzzy set values by reversing the shape of the curve.

So a linguistic variable modified by a hedge would appear as: SELECT EMPLOYEES WHERE HEIGHT IS RATHER TALL AND AGE IS NOT OLD.

Cut through partial set confusion

According to the English magazine *New Scientist*, mathematician and philosopher Bertrand Russell devised a tale about a barber to help clarify the idea of partial set membership, a key concept of fuzzy logic.

Russell tells of a village that tried to divide its people into two mutually exclusive categories — those who shave themselves (and are not shaved by the barber) and those who do not shave themselves (and are shaved by the barber). This seemed straightforward until the village tried to categorize the barber.

In fact, the barber is a complete member of neither category but a partial member of both.

Tell that one to classic logicians. It will drive them crazy.

Fuzzy logic uses these variations of fuzzy sets in natural language queries, rules and procedures integral to the development of IS applications.

Fuzzy logic in IS

With fuzzy logic, it is now possible for IS to automate an entirely new realm of computer applications, such as the following:

- **Information retrieval.** Imagine how much easier information retrieval would be if IS, searching for potential acquisition candidates at the behest of business management, could use statements such as: SELECT ALL COMPANIES WHERE REVENUE IS GROWING RAPIDLY AND PROFITS-TO-EARNINGS RATIOS ARE VERY LOW instead of actual values (see story page 71).

Not only is it easier for users to think in such terms, but the ability to retrieve records using this criteria is also possible only with fuzzy reasoning techniques.

- **Expert systems construction.** The usual way to build expert systems is to have the knowledge engineer, together with the expert, write the "rules" that represent the expert's thought process. But human experts, like everyone else, don't think in terms of fixed values; they think in terms of real world values.

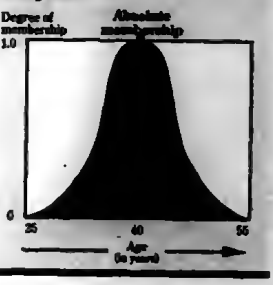
Fuzzy reasoning would enable a medical expert in a medical analysis application to state his rule thusly: IF PATIENT IS VERY OLD, DO NOT RECOMMEND STRENUOUS EXERCISES. Such rules that are not crisp are difficult, if not impossible, to state with most of today's expert systems.

- **Applications maintenance and development.** Today, more than half of the maintenance performed on business applications is because of the changing conditions within a company. That maintenance often involves changing actual values and tables.

Fuzzy logic can reduce maintenance as well as the amount of an application's initial programming by cutting down on the number of rules in an application and separating the variables that drive them.

By allowing computers to think more like people, an entirely new range of IS applications becomes feasible (see stories below and page 71). When we are able to incorporate the reality of imprecision into language that the computer can understand, we will also progress in our ability to build and maintain more robust, adaptable computer applications. ●

Diagram B: The middle-age fuzzy set



Wanted: Easy data retrieval

Fuzzy software lets users select data using inexact terms

BY EARL COX
and MARTIN GOETZ

Fuzzy logic can be used in building applications in which there is uncertainty about the exact characteristics of the data to be retrieved. A good example is the selection of records from a hypothetical criminal detection system: the Municipal Criminal Identification and Profile System (MCIPS). With fuzzy logic software, users of this system and its database can describe a suspect in general terms and retrieve a list of probable suspects.

MCIPS holds the current physical description of wanted criminals in the local area. For our purposes, we will look at just a few attributes: age, height and weight (or — as we call the fuzzy sets — old, tall and heavy).

The list of wanted persons is as follows:

Name	Age	Height	Weight
Jones	22	5'8"	182
Williams	50	5'1"	152
Smith	31	6'5"	192
Carlyle	43	6'2"	275
Brown	19	5'8"	198
Atkinson	37	6'4"	212
Lee	49	4'8"	128
Tosco	56	5'7"	200
Nguyen	61	5'9"	213
Purvey	66	6'7"	270
Vander	23	5'5"	178

Suppose that on the night of June 1, 18-year-old Susan Elliot is mugged and has her handbag stolen while returning from evening classes at a local community college. She has only a brief look at the thief.

At the precinct house, Susan tells the MCIPS officer what she remembers: The attacker was a man, tallish, rather thin and older.

From Susan's description, the MCIPS operator enters a rough outline into the terminal, making allowances for the imprecise nature of the description and for Susan's viewpoint: SELECT NAMES AND DIGITAL PHOTO FROM SUSPECT DATABASE WHERE HEIGHT IS MODERATELY TALL AND WEIGHT IS NOT VERY HEAVY AND AGE, ADJUSTED FOR A YOUNG PERSPECTIVE, IS OLD.

The MCIPS searches through the suspect list, applying the fuzzy set grades to each combination of attributes. Composite rankings that fall below a critical level in truth membership are excluded from this list.

The computer produces another list consisting of Williams (0.87 truth), Lee (0.55), Tosco (0.92) and Nguyen (0.42).

Meanwhile, back at the station, Susan waits as the MCIPS operator calls to the screen a digital image of Tosco, who has the highest truth membership.

Officer: Look at this suspect.

Susan (spilling her coffee): My God!

Officer: That's the man?

Susan: No, that's my Uncle Harry!

Officer: OK, let's take a look at the next highly ranked candidate. How about this one?

Susan (studying the image of Williams): Yes, that's him.

In this way, fuzzy logic provides a rich communications vehicle that allows us to specify a lot of general, nonspecific data in our application development vocabulary.

In everyday business applications, the use of fuzzy sets will have a profound influence. They will allow the formulation of problems, the selection of information and the creation of conceptual models by using an active natural language. ●

Querying massive databases using natural language concepts

BY EARL COX
and MARTIN GOETZ

Databases are great tools. They let us collect and maintain tons of information. But decision makers trying to sort through this weight of data can often be overwhelmed. Fuzzy logic can ease the process of sorting through public databases such as Value Line, Standard & Poors and the Facts Criminal Justice System database. It also helps qualify a company's central or distributed internal databases, such as personnel, marketing and manufacturing.

Today, selecting the precise set of data based on an almost bewildering population of fields requires a detailed knowledge of query language syntax, Boolean expressions and the underlying domain of each field.

Furthermore, every time a new AND or OR condition is added to the search criteria, it increases the search statement's complexity.

Fuzzy logic data queries will greatly simplify the ability to search and retrieve records from these masses of data. To illustrate this, let's consider a basic corporate acquisition application.

The subject database, patterned after Value Line and Standard & Poors, consists of a list of nine companies, their profit-to-earnings (P/E) ratios, revenue, retained profits, number of products and number of salespeople (see chart above).

Looking to buy a company
XYZ Corp.'s list of potential acquisition candidates

Company A	13.40	$500	7.40%	2	8
Company B	7.49	$570	4.22%	1	9
Company C	18.13	$597	10.32%	9	7
Company D	15.42	$650	6.55%	5	14
Company E	19.12	$800	10.90%	6	9
Company F	13.81	$900	2.80%	17	22
Company G	15.16	$1,000	7.92%	10	16
Company H	15.90	$1,200	8.70%	8	9
Company I	16.02	$1,280	9.00%	5	8

Using this financial database, company XYZ Corp. is searching for acquisition candidates that meet certain operating profiles. Initially, XYZ wants to focus on the companies' revenues and, more specifically, on all companies with at least $600 million in revenue. An XYZ information systems staff member makes the following request: SELECT COMPANY WHERE REVENUE > 600.

This statement, which will slice through the database using crisp boundary points, uses the standard rules of computer language that insist on arbitrary cutoff points. In this case, only companies D through I would appear as potential candidates.

Expressing the query in crisp terms implies that revenue of $600 million is acceptable but revenue of $599 million is not. It is more likely, however, that what was meant was that the closer the revenue of a company is to $600 million, the more interesting it is as an acquisition candidate.

Language building blocks

As we've seen, fuzzy sets offer a means to let us express that concept because they serve as building blocks of linguistic expression and allow us to define a conceptual, rather than precise, definition of our target data.

Suppose, then, we define a fuzzy set called high that is mapped to the revenue stream of the company. This fuzzy set is 0 below $550 million and 1 at $1,400 million (see chart at right). The truth number for each revenue is shown.

IS can use the term "high" to select a broad and imprecisely defined set of possible candidates for acquisition. Such a query can appear as: SELECT COMPANY WHERE REVENUE IS HIGH.

This database query would add companies B and C to the list of potential takeover targets because they are close to the original lower boundary of $600 million in revenue.

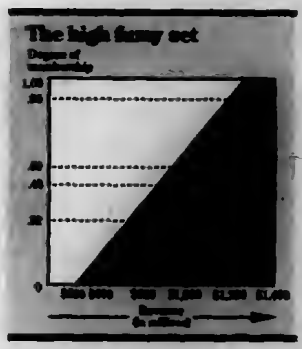
What did using fuzzy sets accomplish? Why couldn't IS just lower its selection criteria for revenue to $500 million, thus including a larger domain of companies?

The answer, of course, is that it could have done that. It could have established a mathematical surface for each of the selection points and adjusted these up and down to include companies that fall near the range.

However, employing such a technique can cause problems. As IS lowers or raises crisp boundary points, it can select too many or too few companies.

For a small set of instances, this is simply bothersome. For an on-line database of many thousands (or even millions) of records, the selected candidates could overwhelm the company's ability to distinguish the best candidates.

Using fuzzy logic, IS will expand the number or records retrieved when it enlarges the set, but these records will come back with truth values. These numbers enable IS to pick those records that come closest to meeting its objectives.



Retrieving a large number of records using traditional computing methods becomes even more troublesome when the selection criteria involves a complete set of expressions connected with AND as well as OR conditions. As an example, IS might say: SELECT COMPANIES WHERE REVENUE > 550 AND PE.-RATIO > 16.

We now have compound selection criteria that must determine which selected companies are valid candidates, chosen because they match two criteria.

But what if we make the selection criteria match only one of the two criteria, such as: SELECT COMPANIES WHERE REVENUE > 500 OR PE.RATIO > 16?

Here we have further complicated our ability to rank the selected companies according to their viability as candidates because the normal selection criteria operates at crisp boundary points using discrete Boolean algebra.

Again, we could lower the acceptable P/E ratio to encompass more companies, but this would simply expand our selected set of companies without grading or ranking them according to their viability as candidates.

Fast modification

By using fuzzy sets, linguistic variables help us to quantify our requirements in more general terms and allow us to quickly modify the selection in a vocabulary space rather than in an expression space.

Fuzzy logic offers us a method to reduce this decision complexity. Users can interrogate the underlying database through natural language concepts.

The computational logic that is involved in decision-making is dramatically simplified because a single fuzzy set can represent a rather large amount of arithmetic qualifications. •

Information central

Products

The U.S. has had a slow start in getting off the blocks with fuzzy logic-related products. For their part, the Japanese have already incorporated fuzzy logic techniques in microprocessors used in Camcorders, televisions, elevators, subway car control systems and other everyday devices.

However, the U.S. is not without its own fuzzy logic tool vendors:

- Cubicalc, Hyperlogic Corp. (Escondido, Calif.): Tool for fuzzy systems development that runs under Microsoft Corp.'s Windows.
- Guru, Micro Data Base Systems, Inc. (Lafayette, Ind.): Expert systems shell with fuzzy logic capabilities offering spreadsheet and database interfaces.
- Talus, Knowledge Based Technologies, Inc. (White Plains, N.Y.): Originally developed as a full mainframe expert systems shell, it now offers fuzzy computational power.
- Tilshell, Tongai Infralogic, Inc. (Irvine, Calif.): Tool for creating fuzzy expert systems. Firm also supplies Fuzzy-C Development System, which enables creation of C runtimes of fuzzy set applications.

Contacts

Here is a contact list for more information or reading on fuzzy logic systems:

Fuzzy Sets and Systems
North-Holland Publishing
New York
(212) 989-5800

IEEE Neural Networks Council
First International Conference on Fuzzy Systems
March 1992, San Diego
Organizing Chair: Jim Bezdek
University of West Florida
Pensacola, Fla.
(904) 474-2784

International Journal of Approximate Reasoning
Elsevier Science Publishers Ltd.
New York
(212) 989-5800

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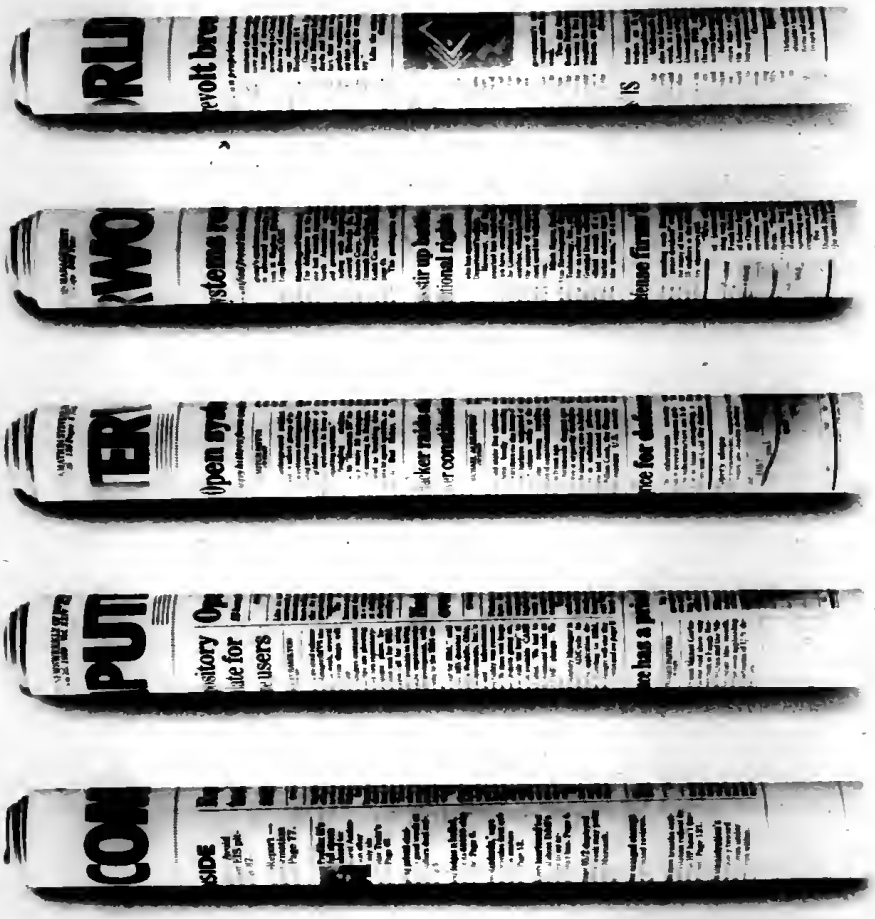

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23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Supvr. of Programming, Software Dev.
32. Programmers, Software Developers
00. Sys. Integrators/VARs/Consulting Mgt.
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23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Supvr. of Programming, Software Dev.
32. Programmers, Software Developers
00. Sys. Integrators/VARs/Consulting Mgt.
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51. Sales & Mktg. Management
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NATIONAL BRIEFS

Count us back in

▶ "It has always been [our] objective to recapitalize outside of Chapter 11," **Concurrent Computer Corp.** Chief Executive Officer Denis Brown said. Last week, the struggling real-time systems vendor took a quantum leap toward that objective. The terms of a multipart debt restructuring plan that passed muster with the company, its bankers and its bondholders not only saves the firm a big chunk of money but triggers the bondholders' promise to withdraw the involuntary bankruptcy petition they filed earlier this year.

And while you're at it . . .

▶ **Datapoint Corp.** late last month reported a $1 million net profit for its second quarter, ended Jan. 26 — a striking contrast to the $9.4 million net loss posted by the network systems products vendor in last year's corresponding period. Revenue for the quarter increased 3% to $69 million. The black ink helps position Datapoint for a planned expansion into open systems, President John Harrison said.

Bagging a big E

▶ Shape up or ship out, says the old saw, but at **Octocom Systems, Inc.**, the idea seems to be ship out and shape up. Last week, the Wilmington, Mass.-based networking products vendor won the **President's "E"** award — an honor given by the president of the United States to firms that have distinguished themselves in exporting. According to Octocom CEO Ian Davison, the firm is no bandwagon rider. Rather, he said, it hopped on the global expansion trend seven years ago and is now doing more than 80% of its business in about 60 countries.

Closer to home

▶ **Unisys Corp.** Executive Vice President **Cyril Yansouni**, former president of the Unisys Computer Systems Products Group, cited personal reasons — including a wish to stop commuting between his Palo Alto, Calif., home and his office in Blue Bell, Pa. — for his departure from the firm, effective March 1. Yansouni, who was responsible for long-range product marketing plans, moves to the post of CEO of Milpitas, Calif.-based disk drive component maker **Read-Rite Corp.**

IPL snaps back from the brink

BY MARYFRAN JOHNSON
CW STAFF

WALTHAM, Mass. — IPL Systems, Inc. knows what it feels like to play David to IBM's Goliath but lose the game.

Yet during the past few years, the company has managed its reincarnation by shifting its core business from plug-compatible mainframes to a lucrative niche providing tape, memory and storage products for IBM midrange computers.

A company whose stock once spiraled down to ⅛ of a point has rebounded into the high 20s on Wall Street, boasting a series of new distribution agreements and products, $16 million in back orders and plans to increase its staff of 118 by 50% this year.

"We understand the power of IBM, but we're not sufficiently big enough to be any disturbance to them," said Robert Norton, IPL's president and chief executive officer.

Found its niche

Today, IPL designs and does final parts assembly and testing on a range of data storage subsystems and add-in memory products for IBM System/36s, System/38s, Application System/400s and 4381s. Its latest products, introduced last fall, are the 7636 1.8G-byte disk array and the 6850 series of 8mm cartridge tape drives.

IPL nearly doubled its 1989 revenue of $14.7 million to $28.7 million this past year, reflecting in part its entrance into the midrange storage market with the 7636 disk array. The firm expects to ship more than 1,000 arrays this quarter, Norton said.

Founded in 1973, IPL built itself into a minor-league contender in the low end of the plug-compatible mainframe market. It sold about 400 of its 4400 series mainframes and shipped the last systems in 1988.

By 1985, however, the firm was hemorrhaging financially as fierce price wars between IBM and the major Japanese mainframe contenders squashed the smaller mainframe vendors. From a height of 270 employees and $17 million in sales, IPL plunged to 19 employees and losses of $11 million.

"We effected our turnaround by trimming the staff and using the last sales of [the 4400 series] as a cash cow to invest in storage technology," Norton explained. "We wanted to stay in the IBM marketplace because we understood that architecture."

Stephen Ippolito, company founder and chief engineer, said customers willing to risk IBM's ire by buying from third-party vendors are looking for three attributes: super reliability, increased density and lower cost per megabyte.

"In tape systems, more and more users are going to unattended backup or lights-out operations," Ippolito said. "Automated tape libraries are another technology we're looking at."

To boost its service and support capabilities, IPL struck an agreement in December with Bull HN Information Systems, Inc. Although IPL equipment does not run on Bull machines, the Bull field representatives will be servicing those storage and tape subsystems. Industry analysts said such a move makes eminent sense for a company whose distribution network is crucial to its success.

Recovering nicely

Shifting its emphasis from the mainframe business to peripheral equipment has helped IPL Systems climb out of the $2 million hole it was in five years ago

	Revenue	Net income (loss)*
1990	$28,708	$5,501
[illegible]	$14,[illegible]	$2,341
[illegible]	[illegible]	$1,404
[illegible]	[illegible]	$1,759
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

*In thousands

Source: IPL Systems   CW Chart: Doreen St. John

Understanding what third-party distributors want was another key to IPL's hearty recovery, according to Norton. "We have no end-user sales organization to compete with their channels."

For IPL's biggest competitor, however, that lack of a direct sales force is seen more as a curse than a blessing.

"If you can't fix it, feature it," scoffed Mike Egan, vice president of EMC Corp. in Hopkinton, Mass., the market leader in third-party IBM storage vendors, "We sell through both our own sales force and through distributors, and we can price our products as effectively as IPL."

Future in storage

Yet Egan acknowledged that IPL has both a broader product line and a definite edge because its disk array products are built around IBM drives. "There is a certain percentage of customers who won't buy anything but IBM, and going in with a drive made by IBM increases your chances of getting them to buy from you," Egan said.

"IPL is a pretty focused company, but they are fairly small in the grand scheme of things," said Bill Sines, director of midrange systems at Technology Investment Strategies Corp. in Framingham, Mass.

Sines said the firm has rounded out its tape offerings with the first 8mm helical-scan tape products for the AS/400. "Their disk offering is still a little sparse, but the price/performance of the 7636 [disk array] is attracting a lot of attention," he added.

A natural next step for IPL, Sines said, would be a move into open systems products.

"The problem there is that IPL will be competing with some heavy-duty players in established technology. A move into open systems will reduce profit margins but opens up a larger market down the road," Sines said.

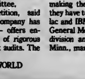
Software group gets bitten by the quality bug

BY NELL MARGOLIS
CW STAFF

ARLINGTON, Va. — Software industry association Adapso planted its flag in the burgeoning total quality management movement late last month with the announcement of its first annual quality awards program.

Inspired by and based on the qualification procedures of the U.S. Department of Commerce's Malcolm Baldrige National Quality Award program, the Adapso awards will recognize top software and service performers not only in a "total quality" category but also in a more discrete "functional quality" category that rewards standout achievement in such frequently overlooked categories as customer support, documentation and training, according to Adapso.

"With all the attention that the Baldrige is getting and all the money that is being spent on it, we feel that fewer and fewer software and service companies will take it on — it's just too formidable," said Triad Systems Corp. Chief Executive Officer Jim Porter, chairman of Adapso's Quality Management Committee.



Baldrige competition, said Porter — whose company has been through it — offers entrants the benefits of rigorous quality management audits. The judges' anonymous written critiques alone, he said, made the experience well worthwhile.

Such discipline, Porter said, could benefit the software industry and the users who need reliable software products and services. Owing to an artisan-like mystique that has traditionally characterized the field, he said, "software development may be one of the last frontiers of quality. That has to change."

The Adapso awards, he said, are being offered as an equally rigorous but more broadly defined alternative. They are aimed at spurring firms toward improved products and processes and recognizing superior achievement without making the entrants "feel that they have to compete with Cadillac and IBM to win," he added. General Motors Corp.'s Cadillac division and IBM's Rochester, Minn., manufacturing operation are recent Baldrige winners.

To encourage more companies to take part, said consultant and Adapso committee member Burton Grad, who was active in spearheading the effort, separate awards will be made to large ($20 million or more in annual revenue) and small firms.

Because of budgetary constraints, Porter said, competition for the first Adapso awards, which will be presented the first week in November, is limited to members of Adapso's Software Industry and Vertical Application & Remarketers divisions; in subsequent years, all Adapso members will be eligible.

Will an entry restriction to dues-paying members invite cynics to speculate that Adapso is trying to raise revenue as well as standards? "Yes," Grad conceded. However, he said, the restriction was created to inspire team spirit in the software sector. "We want to preclude lone wolf developers."

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INTERNATIONAL BRIEFS

And so it goes

▶ The European Community ministers approved a $646 million research and development program last week for future communication technologies. Slated to run through 1994, the program will divide spending among eight research areas — but not evenly. Winning almost one quarter each of the funds are experiments in advanced communications ($162 million) and research into integrated broadband communications ($148 million).

Let's get closer

▶ Advanced Logic Research, Inc. (ALR) has come up with a straightforward strategy for moving closer to its European customers: It is moving closer to its European customers. Next month, the Irvine, Calif.-based personal computer maker will open a wholly owned subsidiary in Frankfurt — a move aimed at immediately upping ALR's service and eventually boosting the firm to first-tier status in the European market, an ALR executive said.

State of alliance

▶ What do the state of Israel and the state of Massachusetts have in common? Plenty, according to the business and government leaders who put together the recently announced New England-Israel Joint Business Alliance Project. Pivoted on a database of companies actively seeking international joint venture partners, the Alliance Project will promote commercial cooperation between the Middle Eastern region and the New England region, led by Massachusetts — which, like Israel, can leverage a strong technology base and a proliferation of prestigious educational institutions. Just for starters, Israel has pledged to cut through red tape for its New England partners, offering government approval within 12 days to joint ventures emerging from the alliance.

Better safe than sorry

▶ Taiwan is in the chips — but apparently not as far in as it would like to be. According to a recent report in the Taiwanese press, Minister of Economic Affairs Vincent Siew will visit Intel Corp.'s Santa Clara, Calif.-based headquarters next month to ask for larger supplies of the firm's 80386 and 80386SX chip sets. Taiwan is one of Intel's top customers for the 386 and 386SX processor, but bottlenecks have created a scarcity of the chips in Taiwan in the past.

Tech focus wins big at small firm

Task forces devote time to technology areas important to business

BY GARY H. ANTHES
CW STAFF

SILVER SPRING, Md. — Every week, newspapers in the Washington, D.C., area print a list of companies that have won government contracts for computer systems work. The list is a familiar one, filled with names such as IBM, Electronic Data Systems Corp., Computer Sciences Corp. and Orkand Corp.

Orkand Corp.?

Privately held Orkand, with revenue this year nearing $38 million, is not yet in a league with the systems integration behemoths, but the company has managed to sidestep both the recession and the federal government's budget cuts. During the past six months, the information systems and consulting firm wrote $90 million in new orders, bringing its backlog to $100 million.

The company's success is not a recent phenomenon; Orkand's sales have been growing steadily, more than tripling since 1987, when it sold $12 million in professional services.

What's the secret?

If you ask President and founder Donald S. Orkand the secret of his success, you will get an answer that could come from the annual report of any firm in the land. He will tell you about cost-conscious management, putting the customer first and treating employees well.

However, a closer look reveals that Orkand has put in place two unusual mechanisms for ensuring that the small company gets the most out of worthwhile new technologies while avoiding the fads he said sometimes distract his competitors.

First, at any given time, the firm has from eight to 12 task forces devoted to areas of technology that are, or may be, important to Orkand's business. Anywhere from three to 15 employees serve on each task force, devoting eight to 10 man-years each year to topics such as database technology, operating systems, computer-aided software engineering (CASE), geographic IS, image management and internetworking.

Survival tactic

The task forces led to the company's early and profitable entry into desktop publishing, Unix and microcomputing, which Orkand said was deemed a "survival issue." On the other hand, task force efforts have led Orkand to conclude that it is too early to make major investments in artificial intelligence, parallel processing and the Ada programming language. "We revisit those [alternatives] each year," he said.

The groups were established to advise management about which technologies are needed to support existing and future clients. However, they have evolved into internal think tanks — pockets of expertise that help out with training, marketing and project work, Orkand said. They also have direct input into the company's five-year plan, which is built around an annually updated matrix that relates potential clients and technologies.

"My sense is that some companies focus too much on fads. We're trying to get underneath all the hand waving. Some say CASE is a panacea; some say it's just hype," Orkand said. "Some [CASE tools] are useful, and some are not. We want to see what works and what doesn't and see how to use it."

High-tech ideas

Orkand complements the task forces with a five-person advisory board made up of senior technology managers from outside the company. Like a board of directors, the technology board is paid for its services, but according to Orkand, the members serve more for the satisfaction of seeing their ideas implemented and out of a sense of loyalty to Uncle Sam, for whom most have worked.

The technology board meets quarterly and has frequent informal contact with Orkand managers and the task forces, Orkand said.

He added that he hopes to take the firm public within four or five years. If he does, however, he will not combine the board of directors and the technology advisory board. "You don't want people like this reviewing pension plans," Orkand said.

Orkand recently held its Second Annual Technology Fair, an all-day Saturday program of short presentations given by each of the task forces, bisected by a buffet lunch and a keynote address by one of the technology board members.

No small potatoes

Orkand's unorthodox means are leading to some rewarding ends, as this sampler of recent contract wins demonstrates:

- **U.S. Department of Energy, Energy Administration:** $27 million for systems support services to support activities in the Persian Gulf.
- **The National Cancer Institute:** $4.5 million to provide data processing support for collection of clinical trials data.
- **U.S. Postal Service:** $13 million to support address management systems at the Memphis National Address Information Center.
- **U.S. Department of Housing and Urban Development:** $6 million to support new and existing systems to track housing discrimination complaints.

Orkand's Orkand gets the most out of new technologies

Zenith sells shares, contests proxy

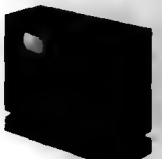
BY ELLIS BOOKER
CW STAFF

GLENVIEW, Ill. — Zenith Electronics Corp. established a strategic partnership with Goldstar Co. late last month, selling 1.45 million shares of company stock to the Korean electronics giant for $15 million.

Zenith officials called the deal a "strong endorsement" of the company's high-definition television (HDTV) strategy, in which it has invested heavily, and said additional licensing and technology arrangements with Goldstar would be a vehicle for overseas business.

However, Zenith's largest shareholder, Nycor, Inc., blasted the stock sale as a defensive tactic designed to dilute its own position in Zenith and block its effort to replace three members of Zenith's 10-person board.

Peapack, N.J.-based Nycor, which holds an approximate 7.6% stake in Zenith with 2.2 million shares, has waged the proxy battle for the board seats since late last year. It has asked shareholders not to vote for Zenith Chairman Jerry Pearlman and two other incumbents at the upcoming annual meeting next month.



"I completely agree with Zenith that there are plenty of good business reasons for the Goldstar agreement," said David Schofield, an analyst at Duff & Phelps Investment Research Co. in Chicago.

Still, the timing and details of the deal conveniently serve to weaken Nycor's hand, Schofield said. Nycor, he added, will have a tough fight to elect its candidates to the Zenith board, given that its stake in Zenith has slipped to 7.6% and its proxy fight does not include a cash tender offer.

Meanwhile, Zenith fights its balance sheet. The company recently reported a fourth-quarter loss of $25.5 million, for an overall loss of $52.3 million in 1990. Zenith has lost money in five of the last six years. In 1989, it sold its Data Systems unit to France's Groupe Bull for $511.4 million.

In addition to the stock sale, Zenith and Goldstar signed licensing and technology agreements for Zenith's flat tension monitor color picture tube. The agreement does not include flat tension monitor technology for computer displays, however. A separate agreement calls for Goldstar to promote the adoption of an HDTV broadcast standard that supports Zenith's Digital Spectrum Compatible approach.

Both the stock and technology agreements are being reviewed by the Korean government, Zenith said, adding that Goldstar had indicated that this regulatory approval should be completed in the spring.

Turning bad news into a good job

Being prepared for a layoff can make all the difference when the ax falls

BY ALICE LAPLANTE
SPECIAL TO CW

When it became apparent that there would be layoffs at Balcor Co., a Chicago real estate management firm, Stuart Bard, then-vice president for office automation, immediately began contacting his network of friends, former employees and information systems colleagues at other organizations to find out about prospective jobs at other area firms.

"My wife and I were expecting a baby, so I didn't want to make a sudden change," says Bard, who is now a director of the consulting division of Blackman Kallick, a Chicago accounting firm.

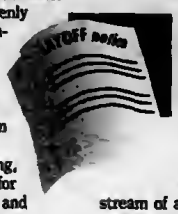
Bard waited and planned, and when the expected layoff came, he was prepared. He negotiated a termination package that included severance pay, continued insurance for a limited time and outplacement services provided by a third-party firm. He then began his search for a job, a process that took him two and a half months.

Bard used that time to re-evaluate his past accomplishments and to think about where he wanted to take his career. The result? He is now a consultant specializing in work re-engineering — an exciting new twist to his career. He advises organizations about how they can use technology as an "agent of change."

"What was a negative circumstance turned out to be positive for my career," Bard says.

Be prepared

Turning a bad situation into a good one often takes extra research and preparation. In times of layoffs, it can mean the difference between suddenly being out of a job without any prospects or being ready for the next career step.



Experts say there usually are signs when a layoff is imminent:

- Sales are decreasing, and target revenues for the month, quarter and year have not been met.
- Plans are made to consolidate operations and to close remote data centers, warehouses or branch offices.
- A hiring freeze is imposed on new positions, and jobs that become vacant through attrition remain unfilled.
- Managers appear worried and spend a lot of time in closed-door meetings with superiors.

There are things an IS professional can — and should — do if these signs appear. Indeed, many people believe a continuous "reality check" into the job market is something all IS employees should do no matter how secure their jobs appear to be.

"The occasional interview should go on all the time," says Pete Bradshaw, president of Organization Consultants, Inc. in Charlotte, N.C., a consulting firm specializing in human resources and personnel issues. "You need to keep your interviewing skills sharp and maintain an accurate assessment of the current market. There is no way to do that except practice."

During a downturn, the jobs at stake tend to be outside the mainstream of a firm's business, experts say. "Support jobs, staff roles or administrative positions tend to go first," says Andrew G. Spohn, president of A. G. Spohn and Associates, a management consulting firm in Summit, N.J. But this kind of thinking can be shortsighted: If things get really bad, core business positions will also get eliminated. Moreover, even if you survive an initial cut, the first wave of layoffs is often not the last. "You can survive one only to get caught the next time around," Bradshaw says.

The best thing to do in troubled times, experts say — even if you are quietly looking elsewhere for opportunities — is to appear committed to your job and your organization. "This is clearly not a time to go raising issues or complaints," Bradshaw says. "It is a time to demonstrate commitment, loyalty and productivity."

Important moment

If the worst happens and you are laid off, it is important to stay calm and ask right then and there for the best possible termination package.

"Frankly, the best time to negotiate is often the hardest time: the very moment when you are being laid off," says Susan Gould, president of Gould and Associates, a Palo Alto, Calif.-based outplacement firm. "That is the time to remind your employer what you've done for the company and what they should do for you."

The following are some questions to ask during a termination interview:

- How much will my severance pay be?
- Will I still receive health benefits? If so, how long will they be continued?
- What happens to pension, stock options, profit sharing and other nonsalary compensation accumulated during years of employment?
- Will outplacement or counseling services be provided free?
- Is my boss willing to write a letter of recommendation or provide contacts for my job search?

"These [severance benefits] are not etched in stone and very often can be improved with negotiation," Bradshaw says. "And get that recommendation before you walk out the door." There is nothing wrong with asking colleagues remaining at the firm for help in your job search, Bradshaw adds.

> "FRANKLY, THE BEST TIME to negotiate is often the hardest time: the very moment when you are being laid off."
>
> SUSAN GOULD
> GOULD AND ASSOCIATES

Asking for a longer period of insurance coverage, a higher amount of settlement cash or the help of an outplacement firm are just a few of the things that can be negotiated.

Above all, get the termination agreement in writing, Spohn and others say. "The termination interview is a very emotional and poignant conversation, and no one remembers exactly what they said or heard," he says.

LaPlante is a free-lance writer based in Palo Alto, Calif.

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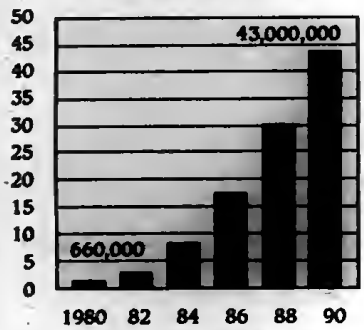
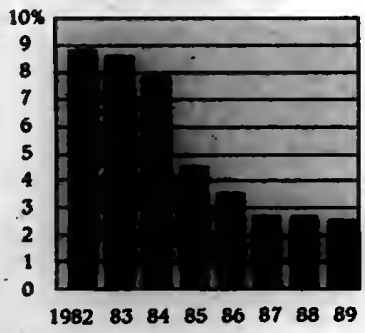


Fewer campus freshmen are choosing computer careers**



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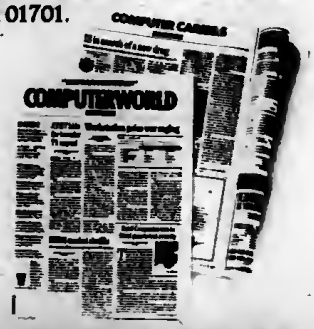

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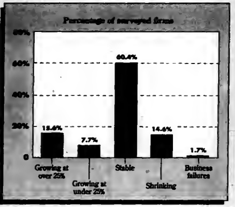

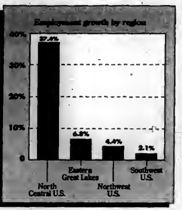

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MARKETPLACE

How to buy used PCs without getting ripped off

BY ALEX RANDALL
SPECIAL TO CW

Information systems buyers eyeing new personal computers and engineering workstations shouldn't overlook the used computer market. With hundreds of rungs on the computing ladder, chances are good that the systems of their dreams are someone else's throwaways.

Hunting in the used market holds distinct advantages, not the least of which is money in the bank: New computers lose as much as 40% of their purchase price once buyers open the box.

Used computers are also an attractive option because they're tested tools. If they've been through their warranty, then questionable components have most likely already failed and been fixed.

Furthermore, used computer buyers get the first owner's labor for free: The first-time owner spends a lot of time configuring the systems, preparing the hard disks, buying necessary peripherals and getting the systems working — a real advantage for the second buyer.

But make no mistake: IS buyers must proceed with caution to avoid the worst dangers in the used computer market.

• Know what you want before you shop. If buyers don't have specific systems and configurations in mind, they can easily purchase the wrong system. The variety of the new computer market is amplified one hundredfold in the used market. Not only are there fairly new models for sale, there are also discontinued models and relics of earlier eras.

• Conduct thorough research. Used computer buyers are frequently guilty of insufficient price research. Buyers shouldn't rely on quick perusals of newspaper want ads or industry magazine advertisements; they'll only end up paying more. Instead, they should check a variety of sources, such as retail computer vendors that take trade-ins and computer brokers, before making purchases.

Furthermore, while the wrong system can be a pitfall, the right system at the wrong price can be worse. No used system should sell for more than its equivalent new system.

Staying on top of prices is a big job, so every buyer should have the systems they intend to buy professionally appraised before the purchase is sealed. An appraiser can also give buyers a firm idea of the value of their current equipment, making it easier to decide whether to keep or sell.

• Test all systems prior to purchase. Buyers should never make a purchase without some financial recourse. The best way to do this is through the services of a used computer broker or by purchasing from a used computer store. A professional broker will hold a buyer's funds in escrow until the systems are tested.

Buyers should also check the reliability of their used computer source, and they should make sure that an inoperable system can be returned.

• Watch for "reconditioned" equipment. If a buyer is purchasing reconditioned equipment, he should find out what the vendor actually did to recondition the machines. All too often, reconditioned means the machines only had their exteriors wiped clean. Full reconditioning means key caps have been removed and cleaned, hard drives have been reformatted, floppies have been realigned and cleaned, interior components have been cleaned and tested and marginal components have been replaced.

• Don't be fooled by warranties on used systems. Most computer equipment that works when it arrives will operate without a problem for many more months than a warranty covers. A test on arrival is worth more than a 30-day warranty. Moreover, most warranties on used gear are depot warranties rather than on-site service contracts. This means that if a buyer's machine goes down, it will be out of service longer than if it was fixed on-site. If your used computer is performing a critical task, you should maintain redundant systems and keep a service contract on them for the long term. This is the best place to spend the money saved by purchasing used systems: Buy additional used systems beyond what is needed to give the IS department 100% backup.

• Guard against certain system purchases. For example, avoid systems that are no longer attracting software developers' interest. Antiques from the early 1970s with old operating systems are not desirable. Buyers can snap them up for small change, but they will find very few new pieces of software for these machines, and they will not save any money in the long run.

Also, buyers should avoid selecting a system that has been used in a smoke-filled environment or an industrial setting. Dust and smoke are hard on computers, and if the systems were not "ruggedized," they may have been damaged by the exposure. The same is true for computers that have been used in high temperatures or damp settings.

• Beware of "hot" computers. When buyers purchase computers in volume or from reputable computer traders, they run little risk of receiving computers with deficient titles. However, if a buyer is purchasing only one or two or is buying through newspaper want ads, he may unwittingly receive a stolen machine. Computers are small, valuable and easily moved: ideal material for petty criminals.

• Think long term. Computers are like baby clothes — companies will outgrow them before they wear out. Buyers should select quality goods with well-known brand names that will hold their value, and they should keep all boxes, pieces and manuals. When it's time to sell, the next owner will pay more for a complete system than a system that's missing the details.

Randall is the author of *Alex Randall's Used Computer Handbook* and is president of the Boston Computer Exchange.

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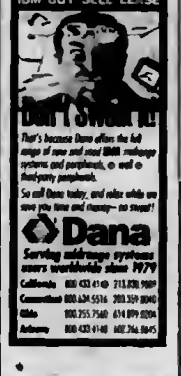

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The BoCoEx index on used computers
Closing prices report for the week ending March 1, 1991

	Closing price	Recent high	Recent low
IBM PC Model 176	$300	$450	$200
XT Model 086	$500	$550	$450
XT Model 089	$500	$625	$400
AT Model 099	$650	$775	$500
AT Model 239	$750	$925	$700
AT Model 339	$925	$1,000	$900
PS/2 Model 30-286	$1,200	$1,300	$1,000
PS/2 Model 60	$1,400	$1,700	$1,300
PS/2 Model 70P	$3,300	$3,500	$2,500
Compaq Portable II	$900	$1,050	$875
Portable 286	$1,100	$1,350	$1,000
SLT 286	$2,300	$2,500	$2,000
Portable 386	$2,300	$2,500	$2,200
LTE 286	$2,200	$2,500	$1,900
Deskpro 286	$800	$1,000	$700
Deskpro 386/20	$2,850	$3,000	$2,300
Apple Macintosh Plus	$750	$975	$700
SE	$1,150	$1,350	$1,100
II	$2,600	$2,800	$2,400
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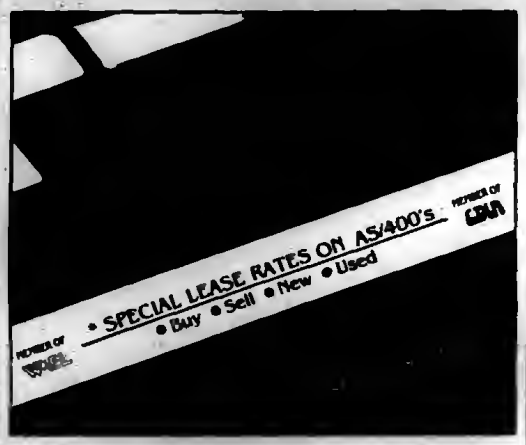

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TRAINING

Getting your education at vendor 'universities'

BY KATIE CRANE
SPECIAL TO CW

In the 1980s, Roger Angell, director of technical support and end-user computing at Hawaiian Electric Co., felt isolated and alone in his quest for quality training. He could rarely authorize travel to the mainland for training because of the costs, and the chances were just as slim that he could find local technical training companies for his systems and applications programmers.

Today, Angell's problem is shared by many information systems managers. Companies that once didn't blink an eye at sending someone far away for training are cutting travel and training budgets. Budget limitations are also causing managers to demand more for their training dollar: greater flexibility, increased frequency, broader course offerings and classes closer to home.

Some of the most accessible training courses to meet these requirements are being offered by product vendors. While there are pros and cons to relying on vendor-sponsored training, many managers view the programs favorably because of their content and flexibility.

Companies such as IBM, Microsoft Corp., On-Line Software International and Amdahl Corp. not only offer a full range of courses through their traditional brick and mortar "universities" — separate locations designated for education and training — but they are extending the university concept: adding regional training centers, increasing the frequency of in-house course offerings and creating alliances with key users and local colleges, using them as host sites for public courses.

For example, this year, Hawaiian Electric will host seven public courses, mostly in CICS, offered by On-Line Software, which provides training for both IBM and On-Line Software products. Angell speculates that vendors are intensifying and broadening their training offerings. "They're re-examining the relationship between training as a marketing tool and training as a revenue producer in its own right," he says.

"It's a fine line," acknowledges Tina Podlodowski, general manager at Microsoft University in Bellevue, Wash. Because Microsoft University is a separate profit center, Podlodowski says, "Our training supports the sale of systems products, but it also needs to stand alone as a viable training company." At Amdahl, IBM and On-Line Software, training is also a separate business.

However, vendors say their commitment to training goes deeper than revenue-building: They have to support their users, and right now, users want their vendors to be flexible and accommodating.

Whatever the reason, hundreds of thousands of students cycle through vendor training each year. While many users acknowledge that such training could be a sales platform for vendors, most agree that this has not been the case. Because of the arm's length relationship between training groups and salespeople, sales pitches are less likely to interfere with instruction.

There are few alternatives to vendor-sponsored training. For many users, developing such courses in-house would be prohibitively expensive, especially if there are only a few people to train each year. In addition, skills-specific technical courses in local colleges have always been difficult to find. Even where such courses do exist, few offer the most current (sometimes not yet public) information about new releases and technology.

All of the major vendors offer courses delivered in-house or customised courses designed to meet a company's specific needs. Many license their most popular courses to other trainers, resellers or directly to their users. Some, such as IBM, will go so far as to help their users develop their own course curriculum.

User-friendly

Convenience was the driving force behind Felix Santella's decision to pick software vendor On-Line Software to conduct his company's training. Santella, a senior systems manager of data management at Commerce Clearing House-Legal Information Services in New York, hired On-Line Software to customize several of its standard offerings for his company. He had reviewed several information engineering training programs provided by other vendors, but in the end, he opted to ask On-Line Software to customize their courses so be wouldn't need to send his people to several different classes at different times.

Santella also liked the fact that On-Line Software didn't push any products. In addition, it offered the best price and reacted quickly to his training needs.

Others take a more guarded view of vendor offerings. While Angell is pleased that vendors are now making training more convenient to users, he makes a clear distinction between "vendor" and "third-party" training. Vendor training, such as that from IBM, in which the product developer offers the training, is most effective when a class featuring a new product or new release is taught by someone on the development team who can give insights *not* yet available through user experience. He specifically remembers attending one such class where the developer/trainer "shared all sorts of stuff that wasn't documented" but was vital to the product's successful implementation.

Angell would be more likely to select third-party training, like most of the IBM training available from Amdahl and On-Line Software, for a product that's been out for a while. He figures that there would be less sales talk and more content, and "we'd hear more about any negative aspects of the product."

Meeting user needs appears to be the impetus that drives vendor training programs today. Vendors find themselves — at their users' requests — continuing to offer more traditional skills training for programmers and support engineers, expanding their offerings to include executive education and end-user training and seeking more innovative ways to serve a varied menu of training and related services to hungry users.

Crane is a free-lance writer based in Norwich, Vt.

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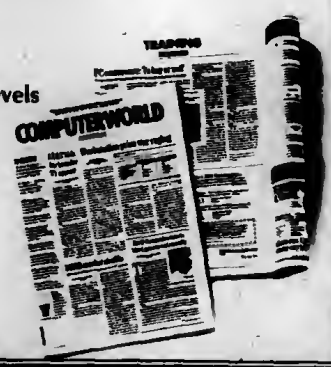

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COMPUTERWORLD

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INDUSTRY ALMANAC

RECOMMENDATION CHANGES

UPGRADED FROM HOLD TO BUY: **Silicon Graphics, Inc.** (Bear, Stearns & Co.). Reason: Strong long-term stock performance despite slight slowdown in U.S. workstation demand.

DOWNGRADED FROM BUY TO HOLD: **IBM** (Prudential Securities, Inc.). Reason: Entering seasonally weak period when 10% share price drops are not uncommon; flat first-quarter financials predicted.

DOWNGRADED FROM BUY TO ATTRACTIVE: **IBM** (Paine Webber, Inc.). Reason: Shift in market demand from high-cost mainframes to lower margin microcomputers and workstations will cut into 1991 profits.

DOWNGRADED FROM BUY TO HOLD: **Advanced Logic Research, Inc.** (Prudential). Reason: Current-quarter profits will likely increase, but earnings per share will slide as U.S. computer market weakens, even in high-growth personal computer sector.

DOWNGRADED FROM BUY TO HOLD: **Dell Computer Corp.** (Prudential). Reason: Stock is expensive compared with competition; expect price correction to be between $22 and $24.

DOWNGRADED FROM BUY TO HOLD: **Compaq Computer Corp.** (Prudential). Reason: Softening European market — a big revenue source for the firm — will erode profits during next few quarters.

ANALYSIS IN BRIEF

Although Northern California faces its fifth year of drought, chip production at Silicon Valley firms will likely be unaffected by water rationing programs now in place.

Semiconductor fabrication plants use between 5% and 10% of the entire water supply in the Silicon Valley area, but only one-third of it actually goes toward making chips.

During the past year, individual and industrial Valley residents have been forced to cut water consumption by 20% from 1987's peak levels. Early this month, the Santa Clara Valley Water District will vote on whether to mandate a more stringent water-use reduction plan calling for consumption drops of 30% to 35% from 1987 levels. — *Semiconductors, Prudential, Feb. 26, 1991.*

If February's industry announcements foreshadow events to come, then 1991 could be the year of the alliance.

Last month's most significant event was IBM's teaming up with **Novell, Inc.** The companies signed a broad licensing and marketing agreement that allows IBM to start reselling almost the entire Novell product line under its own name beginning this month.

Sun Microsystems, Inc. and **Hewlett-Packard Co.** allied themselves with a pact that could affect **Microsoft Corp.** Sun and HP will work together to lay down workstation standards in response to the graphical user interface fury caused by Microsoft's Windows 3.0. Also notable, **Lotus Development Corp.** bought **CC:Mail, Inc.**, the market share leader among electronic mail software makers. — *Computer Software and Services: The Year of the Alliance, Bear, Stearns, March 1, 1991.*

KIM S. NASH

STOCK TRADING INDEX

THIS WEEK'S HIGHLIGHTS

• Major exchanges again pushed higher last week, partly propelled by hyperactive technology stocks. Digital Equipment Corp. shot up 9⅛ points, closing Thursday at 81¾.

• Apple Computer, Inc. roared 10 points higher to a new apex of 67¼. Late last week, a federal judge threw out two counterclaims asserted by Microsoft Corp. and Hewlett-Packard Co. against Apple in its 3-year-old operating system "look and feel" copyright suit. Microsoft inched up ¼ of a point to 104; HP gained 3⅛ points to 49¾.

• Intel Corp. climbed 4 points to 51¾, while Advanced Micro Devices, Inc. advanced 1⅜ points to 9⅛. Litigation over ownership of the "386" name ended with a ruling that Intel has no exclusive rights to the designation.

• The few losers among computer firms included Cisco Systems, Inc., which dropped 1¼ points to 54⅜, and Zilog, Inc., which dipped ¼ of a point to 13⅛.

Computerworld Stock Trading Summary

CLOSING PRICES THURSDAY, MARCH 7, 1991

TOP PERCENT GAINERS	
Televideo Systems	100.00
Infotron Systems Corp.	82.21
Alliant Computer Sys.	75.00
ASK Computer Sys.	27.68
Unisys Corp.	25.71

TOP PERCENT LOSERS	
Micrografx	-16.30
Computer Automation Inc.	-13.40
IPL Systems Inc.	-12.96
General Datacomm Inds.	-11.54
Iomega Corp.	-4.35

TOP DOLLAR GAINERS	
Apple Computer Inc.	10.00
Digital Equipment Corp.	9.13
Aldus Corp.	6.50
Adobe Systems Inc.	4.88
Knowledgeware Inc.	4.75

TOP DOLLAR LOSERS	
Micrografx	-3.75
IPL Systems Inc.	-3.50
Bell Atlantic Corp.	-1.38
American Info Techs Corp.	-1.25
U S West Inc.	-0.75

Exch	52-Week Range			March 7 Close	Wk Net Change	Wk Pct Change
Communications and Network Services						**Up 6.73**
OTC	10.00	5.38	3COM Corp.	3.38	3.38	4.17
NYS	68.75	60.50	American Info Techs Corp.	64.75	-1.25	-1.88
NYS	44.13	29.00	AT&T	33.38	0.00	0.00
OTC	9.00	0.88	Artel Communication Corp.	6.38	-0.13	-4.17
NYS	56.25	38.50	Bell Atlantic Corp.	47.63	-1.38	-2.81
NYS	57.63	49.00	BellSouth Corp.	53.13	3.38	0.72
OTC	18.25	3.25	Compression Labs Inc.	13.38	2.88	10.70
NYS	40.25	22.38	Contel Corp.	40.25	1.13	2.88
OTC	4.30	1.75	Data Switch Corp.	4.38	0.00	3.38
NYS	20.75	6.88	Digital Comm. Assoc.	18.38	1.38	8.06
OTC	24.75	12.25	Dynatech Corp.	24.75	3.25	10.00
OTC	12.50	5.50	Fibronics Int'l Inc.	9.13	3.25	2.98
OTC	4.00	1.75	Gandalf Technologies Inc.	3.38	0.13	4.55
NYS	4.50	1.63	General Datacomm Inds.	2.88	-0.38	-11.54
NYS	34.13	23.50	GTE Corp.	32.13	1.00	3.21
OTC	9.75	0.75	Infotron Systems Corp.	1.88	3.81	82.21
NYS	60.88	40.25	ITT Corp.	57.25	1.38	3.46
OTC	44.13	17.38	MCI Communications Corp.	27.50	0.30	1.85
OTC	21.00	3.75	Microcom Inc.	6.00	0.00	0.00
NYS	34.38	4.00	Network Equipment Tech.	7.00	0.75	12.00
OTC	14.83	4.00	Network General	12.75	1.50	13.33
OTC	15.30	9.13	Network Systems Corp.	12.00	0.75	6.67
NYS	31.63	22.13	Northern Telecom Ltd	31.63	2.25	7.68
OTC	52.00	17.25	Novell Inc.	52.00	2.13	6.38
NYS	89.50	67.00	Nynex Corp.	76.25	1.75	2.35
NYS	47.38	36.25	Pacific Telesis Group	41.63	-0.63	-1.48
ASE	12.75	4.75	Penril Corp.	12.63	0.63	5.21
NYS	69.13	8.38	Scientific Atlanta Inc.	15.75	3.75	5.30
NYS	69.50	47.25	Southwestern Bell Corp.	54.13	3.38	0.75
NYS	48.38	30.63	United Telecom	25.63	1.13	4.58
NYS	40.75	32.38	U S West Inc.	37.88	-0.75	-1.94
Computer Systems						**Up 10.94**
OTC	9.75	0.38	Alliant Computer Sys.	1.75	0.75	75.00
ASE	13.88	10.00	Amdahl Corp.	13.00	1.25	8.47
OTC	67.25	24.88	Apple Computer Inc.	67.25	10.00	17.47
OTC	13.38	4.25	Archive Corp.	8.75	1.00	12.00
OTC	29.25	7.13	AST Research Inc.	28.00	3.50	14.29
NYS	7.38	3.88	Bolt, Beranek & Newman	6.75	0.13	1.88
NYS	18.38	4.38	Commodore Int'l	17.25	3.38	2.22
NYS	74.38	66.50	Compaq Computer Corp.	71.00	1.75	2.53
OTC	3.63	0.13	Computer Automation Inc.	1.00	-0.16	-13.40
NYS	21.60	6.75	Control Data Corp.	13.75	0.13	0.38
NYS	20.88	8.38	Convex Computer	17.38	0.25	1.48
NYS	31.25	60.00	Cray Research Inc.	42.00	1.13	2.73
NYS	13.25	6.30	Data General Corp.	10.00	1.50	17.65
NYS	8.38	0.75	Datapoint Corp.	2.75	0.38	13.75
OTC	38.88	5.75	Dell Computer Corp.	26.63	1.38	5.46
NYS	89.13	69.50	Digital Equipment Corp.	81.75	9.13	12.58
NYS	38.13	13.75	Harris Corp.	28.25	1.63	6.30
NYS	50.38	24.88	Hewlett Packard Co.	49.75	3.13	6.75
NYS	169.75	95.25	IBM	132.50	3.75	2.91
OTC	14.00	7.75	Information Int'l	8.75	-0.25	-2.75
OTC	25.00	10.50	Intergraph	19.00	0.30	16.38
NYS	3.13	0.50	MAI Systems Corp.	0.94	0.75	25.07
NYS	148.88	114.38	Matsushita Electronics	137.38	0.25	0.13
OTC	69.00	9.00	Mentor Graphics Corp.	16.75	0.50	3.08
NYS	98.00	44.50	NCR Corp.	98.00	2.00	2.08
OTC	35.50	11.00	Pyramid Technology	23.13	3.13	15.63
OTC	34.00	6.75	Sequent Computer Sys.	18.75	3.25	20.97
NYS	44.50	16.00	Silicon Graphics	44.30	4.75	11.38
NYS	69.38	14.38	Stratus Computer Inc.	69.25	3.38	18.20
OTC	37.25	15.00	Sun Microsystems Inc.	34.63	2.50	7.75
NYS	20.13	8.88	Tandem Computers Inc.	14.38	1.25	3.38
NYS	69.30	23.50	Tandy Corp.	33.30	0.30	0.60
OTC	36.50	9.75	Teradata	18.25	3.25	21.67
NYS	7.88	1.38	Ultimate Corp.	6.13	0.38	20.88
NYS	17.13	1.75	Unisys Corp.	6.30	1.13	25.71
ASE	6.13	2.00	Wang Labs Inc. (b)	3.38	0.00	0.00
Software & DP Services						**Up 8**
OTC	53.00	17.30	Adobe Systems Inc.	53.00	4.88	10.13
OTC	50.75	16.75	Aldus Corp.	50.75	6.50	14.68
OTC	24.88	12.00	American Mgmt. Systems	23.88	1.00	4.37
OTC	16.30	7.50	American Software Inc.	13.25	0.25	1.88
NYS	3.25	1.38	Artacorp Inc.	8.30	0.38	14.38
OTC	23.50	10.30	Analysts Int'l	16.25	1.75	12.07
OTC	15.13	4.88	Ashton Tate	8.38	1.30	12.70
OTC	10.25	4.00	ASK Computer Sys.	9.13	1.75	27.68
NYS	98.75	69.25	Auto Data Processing	65.25	2.88	4.61
OTC	60.25	32.00	Autodesk Inc.	53.00	4.38	8.72
OTC	30.50	12.00	BGS Systems Inc.	30.25	3.50	1.30
OTC	42.75	17.75	BMC Software Inc.	42.75	4.30	11.75
OTC	21.50	11.00	Boole & Babbage Inc.	16.00	1.00	7.14
OTC	68.25	13.13	Borland Int'l	31.75	3.50	7.25
NYS	11.88	0.88	Businessland Inc.	8.30	0.13	5.26
OTC	18.00	4.60	Cognos Inc.	17.63	1.13	6.62
NYS	16.88	4.38	Computer Associates	9.13	0.00	0.00
OTC	17.75	7.75	Computer Horizons	13.25	-0.50	-3.64
NYS	65.25	36.75	Computer Sciences	63.25	8.00	4.38
NYS	12.50	6.63	Computer Task Group	11.00	0.75	7.32
OTC	25.25	13.00	Comshare Inc.	16.75	1.25	8.94
OTC	16.00	3.75	Corporate Software	16.75	0.25	2.17
NYS	47.30	27.38	General Motors E (EDS)	43.25	1.63	3.80
OTC	19.75	7.38	Goal Systems Int'l	17.75	1.30	5.67
OTC	4.75	1.88	Hogan Systems Inc.	4.00	0.50	14.38
OTC	11.38	9.00	Index Technology	11.50	2.25	24.00
OTC	19.13	7.75	Information Resources	13.13	3.38	21.43
OTC	17.50	2.63	Informix Corp.	5.63	-0.25	-4.38
OTC	7.38	1.38	Intelicorp Inc.	2.25	3.13	3.38
OTC	6.30	2.50	Intertest Inc.	5.50	3.13	2.33
OTC	39.50	10.00	Knowledgeware Inc.	38.25	4.75	14.13
OTC	42.38	19.75	Legent Corp.	42.38	4.13	13.75
OTC	39.25	12.50	Lotus Development	26.00	4.00	13.16
OTC	32.00	13.63	Micrografx	10.25	-3.75	-16.30
OTC	112.50	50.75	Microsoft Corp.	104.00	3.25	3.24
NYS	3.38	4.00	On Line Software Int'l	3.25	0.08	10.45
OTC	28.38	4.88	Oracle Systems	3.13	0.13	1.38
NYS	17.88	7.30	Pansophic Systems	11.88	-0.13	-1.08
OTC	7.38	1.25	Phoenix Technologies	6.25	1.25	25.00
NYS	31.25	31.63	Policy Management Sys.	50.25	1.00	2.00
NYS	23.63	11.50	Reynolds & Reynolds	20.00	1.00	8.26
OTC	16.13	6.88	Sage Software Inc.	11.00	1.38	20.38
OTC	24.00	14.75	SEI Corp.	24.00	0.75	3.23
OTC	16.13	12.25	Shared Medical Systems	17.00	0.00	0.00
OTC	33.00	12.00	Software Publishing Corp.	33.00	3.75	12.82
NYS	12.88	3.50	Sterling Software	12.88	9.00	10.38
OTC	35.00	3.50	Sungard Data Sys.	13.13	3.13	0.88
OTC	45.50	17.75	Symantec Corp.	44.25	3.63	1.43
NYS	24.88	4.50	System Center Inc.	7.25	1.25	20.83
OTC	37.25	12.75	System Software Assoc.	22.75	3.38	17.42
OTC	27.38	4.75	Walker	15.88	2.88	23.23
Semiconductors						**Up 8.21%**
NYS	28.38	18.13	Advanced Micro Devices	22.63	0.38	1.88
NYS	11.63	6.50	Analog Devices Inc.	11.50	1.63	16.46
OTC	23.25	3.38	Chips & Technologies	12.50	1.25	11.11
OTC	52.00	28.00	Intel Corp.	51.75	4.30	8.38
NYS	13.50	5.13	LSI Logic Corp.	3.75	0.63	7.88
NYS	16.38	6.75	Micron Technology	13.63	0.13	3.81
NYS	86.38	68.75	Motorola Inc.	64.63	4.88	7.49
NYS	8.88	3.00	National Semiconductor	7.00	0.13	1.82
NYS	46.75	22.50	Texas Instruments	45.75	4.38	10.24
OTC	12.25	3.00	VLSI Technology	9.13	0.63	8.33
ASE	14.88	4.00	Western Digital Corp.	6.25	0.75	16.67
Peripherals & Subsystems						**Up 10.31%**
OTC	6.38	0.08	Alloy Computer Prod.	0.31	0.03	11.38
OTC	2.25	0.38	Apertus Technologies	1.94	0.06	3.38
OTC	24.00	7.88	Banctec Inc.	11.50	1.75	17.88
ASE	10.00	4.13	Cognitronics Corp.	9.75	0.30	3.41
NYS	31.63	14.38	Conner Peripherals	26.25	6.38	8.88
ASE	22.00	7.00	Dataram Corp.	12.50	1.75	16.28
NYS	10.88	4.25	EMC Corp.	8.25	0.13	1.54
NYS	47.25	33.75	Eastman Kodak Co.	45.50	1.75	4.00
OTC	9.88	4.88	Emulex Corp.	3.00	3.00	0.00
OTC	34.50	14.00	Evans & Sutherland	22.25	2.00	8.38
OTC	6.50	3.44	Iomega Corp.	3.50	-0.25	-4.35
OTC	28.25	8.75	IPL Systems Inc.	23.50	-3.50	-12.96
OTC	6.06	0.13	Masstor Systems	3.88	0.06	10.08
OTC	17.00	2.93	Maxtor Corp.	4.94	0.94	23.45
OTC	13.38	6.38	Micropolis Corp.	13.00	0.88	7.07
NYS	93.75	73.63	3M Corp.	90.75	6.38	2.54
OTC	14.50	6.00	Printronix Inc.	6.30	0.50	3.88
NYS	21.38	6.50	QMS Inc.	16.75	1.63	9.88
OTC	28.30	12.38	Quantum Corp.	68.38	2.88	12.30
NYS	9.75	4.38	Recognition Equipment	3.75	-0.13	-2.13
OTC	3.88	4.00	Rexon Inc.	6.50	0.50	3.35
OTC	19.38	3.63	Seagate Technology	15.50	1.13	7.38
NYS	35.25	11.00	Storage Technology	30.88	3.00	10.75
OTC	4.00	1.25	Tandon Corp.	3.75	0.63	16.80
NYS	22.88	11.63	Tektronix Inc.	22.63	2.63	13.13
OTC	0.63	0.13	Televideo Systems	0.50	3.25	100.00
NYS	38.25	28.00	Xerox Corp.	38.00	1.25	6.30
Leasing Companies						**Up 4.45**
OTC	16.30	6.88	Amplicon Inc.	15.00	0.50	3.46
OTC	4.38	0.31	Capital Associates	0.38	0.30	6.03
NYS	38.50	14.63	Comdisco Inc.	28.13	3.38	0.78
OTC	16.38	9.25	LDI Corporation	12.75	3.50	4.08
OTC	6.38	2.30	Selectern Inc.	3.75	0.00	0.00

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NEWS SHORTS

Perot: Hire a vet

H. Ross Perot, founder of Electronic Data Systems Corp. (EDS) and chairman of Perot Systems Corp., urged computer industry executives last week to give military returning from the Persian Gulf top priority for obtaining jobs in the industry. In the keynote speech at the Federal Office Systems Expo in Washington, D.C., Perot said giving jobs to veterans, including the disabled and minorities, and providing financial aid to soldiers' families are some of the tangible ways to thank the soldiers for their sacrifices. According to Perot, EDS hired thousands of Vietnam veterans who were hardworking, mature employees.

DEC acknowledges EMA delay

Digital Equipment Corp. confirmed last week the schedule slippage of several of its Enterprise Management Architecture components, which were announced last July. Decmcc Director for VMS/Ultrix Management System Version 1.1, originally slated for February shipment, will ship next month, DEC said. The Decmcc Management Station for Ultrix Software, designed to manage Transmission Control Protocol/Internet Protocol networks via the Simple Network Management Protocol (SNMP), shipped this month instead of last November as planned. On the other hand, an SNMP Access Module for the VMS-based Decmcc Director, originally slated to ship last month, did ship in November. The Decnet Diagnosis application, due in February, is delayed at least until April, according to DEC.

Word processor aimed at Windows

Software Publishing Corp. last week announced Professional Write Plus, a high-end word processor for the Microsoft Corp. Windows platform. The $349 package includes a variety of text editing features as well as an implementation of Windows' Dynamic Data Exchange and an integrated front end to electronic mail that allows users to send or receive mail messages without exiting the program.

Fields promoted at MCC

Craig Fields has been named president and chief executive officer of Microelectronics and Computer Technology Corp. (MCC), succeeding Grant Dove, who will continue to serve as chairman of the board at the Austin, Texas-based research consortium. Fields joined MCC as president, chief technical officer and chief operating officer in July 1990. He is a former director of the Defense Advanced Research Projects Agency.

Sun adds NFS products

Sun Microsystems, Inc. announced networking products last week for integrating personal computers into heterogeneous corporate networks. For example, the firm's $395 PC-NFS 3.5 is new Microsoft Windows 3.0-compatible and supports the widespread SNMP. The SNMP support allows PC-NFS-equipped PCs to be managed in a Unix environment. In addition, new terminal emulation products open up multivendor host access to customers who are not Sun Open Network Computing (ONC) licensees. ONC is Sun's modular set of networking protocols and services that allows distributed computing across mixed-vendor networks. Network File System is Sun's network service.

Thieves grab AMD, HP chips

A gun-wielding bandit stole more than 800 of Advanced Micro Devices, Inc.'s (AMD) new AM386 microprocessors during a truck hijacking in Penang, Malaysia, last week. The robber tied up an AMD truck driver and made off with $170,800 worth of chips that were being shipped to the U.S., an AMD spokesman said. AMD's AM386 is expected to be introduced this month. Each chip was worth more than $200. Meanwhile, more than $1 million in computer chips was stolen from a Hewlett-Packard Co. plant in Roseville, Calif., last week. Investigators said they fear the 3,800 microprocessors may have hit the black market within hours.

Adobe flexes typeface muscle

BY RICHARD PASTORE
CW STAFF

BOSTON — Adobe Systems, Inc. unveiled a set of malleable typefaces last week that will bring new versatility and document integrity to desktop publishers. At the same time, it keeps the company one step ahead of competition from the likes of Microsoft Corp. and Apple Computer, Inc.

Adobe's Type 1 Multiple Master typefaces, which was announced here at Seybold Seminars '91, allow users to modify type weight, width, scale and style. In the past, such font variations were available only in separately sold packages.

Currently, users can only change the size of Adobe and other vendors' outline fonts, but this manipulation changes all elements of a piece of type equally. Thus, as letter stems get fatter, letter holes will also "fill in," making the type distorted, hard to read and rather odd looking. With the new fonts, different elements of the letter can be adjusted independently.

The capability will be "very valuable" and most significant for users who work with type professionally and need to continually vary the size and weight of type, said William Gott, an analyst at Gartner Group/Infocorp in Santa Clara, Calif. These users include advertisers, designers, layout artists and production houses.

Users applauded the increased flexibility and creative leeway the product proposes to deliver. "Presumably, it will make the type look better at extremely small sizes," noted Steve Messner, desktop publishing specialist at Imaging International, Inc. in New York.

Adobe also took steps to ensure the integrity of typefaces used in portable documents. Previously, if a designer sent a document electronically to a colleague to be viewed or printed, for example, the colleague had to have the same typeface on his system to ensure that the reproduction was accurate. With the new flexible fonts, designers and receivers can mold their type to mimic the transmitted fonts more closely.

"You don't have to have the [document originator's] typeface necessarily, and still your client gets the integrity of their fonts," said Immeke Graffigna, founder of the New York Professional Postscript User Group and executive vice president at New York graphics service bureau JCH Group.

The new typefaces are compatible with existing Adobe Type 1 technology, the company said. They will be available for Microsoft Windows and Apple Macintosh environments later this year. The company did not announce pricing.

In addition, Adobe announced a font licensing agreement with Digital Equipment Corp. that will allow networked DEC Ultrix and VMS users to send documents to each other for viewing and printing, regardless of font availability. These Decfonts are scheduled to begin shipping in approximately one month.

With the introduction, Adobe is attempting to keep its technology one step ahead of competing products on tap from Microsoft and Apple, according to several industry observers.

U.S. judge rules '386' not Intel's alone

SANTA CLARA, Calif. — A district court judge ruled recently that Intel Corp. does not have exclusive trademark rights to the number 386, which it uses to identify its 80386 microprocessor.

The decision gives Intel competitor Advanced Micro Devices, Inc. (AMD) in Sunnyvale, Calif., the green light to designate its compatible alternative to Intel's 80386 microprocessor the AM386, according to AMD.

However, AMD is restrained from selling the new product until it settles a lawsuit with Intel over its right to use Intel's microcode to manufacture the 386 clone chip.

AMD decided to incorporate the number in its new product name to help its customers identify the clone product as an alternative to Intel's chip.

After Intel learned of AMD's plans last fall, it filed suit against AMD, claiming use of the number infringed on its trademark. However, U.S. District Judge William Ingram ruled that within the computer industry, 386 is used as a generic term and cannot be used exclusively to identify a particular firm's product.

Wordperfect lays down law over alleged license abuse

BY RICHARD PASTORE
CW STAFF

Wordperfect Corp. last week tried to hammer home its network software licensing policy, which it said is widely misunderstood and abused by users. It also announced plans to stop selling discounted single-network copies of Wordperfect Version 5.1.

Wordperfect does not offer concurrent-use network licenses, although it said last week that many users think it does. Instead, customers need a separate license for every copy of Wordperfect software on a network server or node hard disk, according to the company.

Network users tend to copy the product to local hard disks to speed it up and provide a backup in case of network crashes, according to R. Duff Thompson, company vice president and general counsel.

However, several information systems managers refuted that charge. Network users are more likely to download copies of I/O-intensive packages such as Autodesk, Inc.'s Autocad than the relatively light I/O word processor, the managers said.

Managers said they were more concerned with Wordperfect's decision to discontinue as of April 1 its Network Additional Station offering, which sells for $295 compared with the standalone copy's $495 price. Users can still buy the software in five- and 20-copy increments at a discount, though not as cheaply as before.

"That sounds greedy to me," said James Lindermer, director of MIS at Hillier Group, Inc. in Princeton, N.J. "I hope [others] don't follow that lead."

In addition, Wordperfect has recently begun discouraging its academic customers from ordering products directly from the manufacturer, according to some university IS directors.

Network sales of Wordperfect account for 40% to 45% of total sales. The company said it expects that percentage to grow to 65% to 70% by 1995.

Users no longer focus on SAA

Platform still plays a role, but only as part of a bigger IS strategy, they say

BY ROSEMARY HAMILTON
CW STAFF

When IBM presented its Systems Application Architecture (SAA) four years ago this week, customers welcomed it as a long-awaited map that made sense of a disparate product line and pointed users toward future computing paths.

Since then, they have seen a slow rollout of SAA products, some visible IBM stumbles with key SAA pieces and sometimes confusing extensions to the basic architecture. Now, many users say that while they are still supporting SAA, they are no longer counting on it as the final word for their computing strategies.

While SAA will play a role, many users said they now see it as part of their own broader computing strategies that include their own plans, other vendors' options and open systems.

"SAA is pretty basic and fundamental stuff, so it would be hard not to accept it," said John Wood, vice president of computer network services at the Royal Bank of Canada, where third-party office solutions have been installed instead of IBM's Officevision.

"If anyone is just hanging their hat on it, they are in a lot of trouble," Wood said. "It is an important thing, but if you need anything in the short term ... you either look to other vendors' products or develop your own."

Other users contacted recently said they support SAA but are willing to look to non-IBM sources to plug gaps in their computing strategy that SAA cannot currently fill.

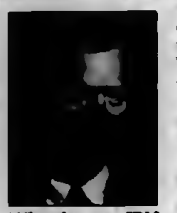
"We intend to use IBM hardware, and we intend to use IBM software as the mainline operating systems," said George Sekely, vice president of computers and communications at Canadian Pacific. As far as other software is concerned, "it's a wide open world," Sekely said. "If IBM's is best, we will use it."

Take an aggressive stance

Some users suggested the key is to try to influence IBM's direction rather than wait for IBM to guide them. Dick Stromberg, an information systems consultant at Du Pont Co., said he works with user groups such as Guide to present ideas and get IBM responses on such issues as computer-aided software engineering.

"We feel it's necessary to put our own thinking out there," Stromberg said. "We are really looking to move toward open — I mean standards-based — defined solutions," Stromberg said. "Some people in IBM are coming to understand that."

IBM defends its SAA track record and argues that it has done a good job of delivering SAA architectures and associated products. On the most basic level, users with any of the SAA-sanctioned products, including the four SAA operating systems, are considered SAA users, said Earl Wheeler, IBM's senior vice president and head of its Programming Systems Division, which handles all SAA efforts.



Wheeler says IBM has met SAA shipment deadlines

In fact, there are several IBM sites that have implemented basic SAA pieces, including mainframe-based applications with OS/2 front ends, and that consider themselves SAA shops as a result.

Wheeler further measures his success in two- to three-year windows from the time a given SAA initiative such as AD/Cycle is announced. Using that framework, Wheeler said IBM has met nearly all product shipment deadlines.

However, there are many other sites that look to SAA to provide them with a truly consistent computing platform, and on that level, SAA has not yet come through for them.

"As a vision, it is great, but it just hasn't happened yet," said Charles Walton, a senior consultant and team leader of IS at Covia Partnership. "The promise is fantastic — portability across platforms. But getting there? Just telling me MVS is SAA does not empower me."

Michael Satejnberg, vice president of technical services at Manufacturers Hanover Trust Co., said he views SAA as "very worthwhile" but does not feel he can currently exploit it.

SAA is "things like Officevision or other things like CICS having the same touch and feel as PC products interfacing with mainframe products," Satejnberg said. "Basically, it's a more integrated environment than what I see as a set of products now."

The Putnam Cos. in Boston applaud SAA, but the company does not see it as the only direction. Although Gavin Taylor, managing director of IS at Putnam, said, "We've been reasonably successful with SAA," he is also currently planning an evaluation of both IBM and Digital Equipment Corp. repository products.

"Our approach to SAA here is that it is a philosophical approach; that's how we use it," Taylor said.

"We are an SAA-compliant shop — but not 100%."

SAA milestones

March 1987:	IBM introduces SAA, its framework for developing portable applications across the System/370, System/34, System/36, System/38 and PC environments
April 1987:	OS/2 Extended Edition debuts with support for SAA's interface, database and communications specifications
June 1989:	The AS/400 replaces the System/34, System/36 and System/38 as an SAA platform
May 1989:	IBM announces Officevision, its first SAA application
September 1989:	IBM introduces AD/Cycle, the first of several SAA-related blueprints for customers
March 1990:	Second release of Officevision is delayed amid indications that IBM is struggling to deliver SAA software
June 1990:	IBM meets the shipment date for AD/Cycle's Repository Manager, releasing a bare-bones version to a few users and software developers
September 1990:	IBM introduces Systemview, its architecture for systems management across SAA platforms
October 1990:	An IBM executive indicates Officevision will recognize Windows and Unix, neither of which is part of SAA
January 1991:	IBM admits more problems with Officevision. It will not provide a new date for Release 2
March 1991:	IBM executive Earl Wheeler reveals plans for an as-yet-unnamed enterprise architecture governing data access

CW Chart: Doreen St. John

Open systems

FROM PAGE 1

them into a position to support the industry standards."

IBM has been moving toward closer ties between AIX and SAA since February 1990, when it said that the two environments will share key elements such as database management systems, networking and network management schemes, languages and user interfaces.

The company formed Saranga's group in November 1990 to develop an overall architectural plan of how this will occur.

Saranga said IBM's open systems effort includes connecting to non-IBM gear. "This has evolved over the past year or two," he said, "and you might consider it a different direction than what IBM has had."

He said customers made it clear that interoperating between SAA and AIX "only goes half the way. We are looking at it as IBM's responsibility to be able to connect and interoperate with what the customer has installed, so we're going to have to talk Decnet Transmission Control Protocol/Internet Protocol, Open Systems Interconnect. And SQL data has to move through the installation."

Second it

Saranga's comments were echoed by Earl Wheeler, IBM's senior vice president and head of its Programming Systems Division, which handles all SAA efforts. Wheeler said SAA and AIX will eventually exist under one common superstructure. "Give us a couple of years, and they'll look precisely the same," he said. He added that IBM is working to bring together what he called "the three views" of SAA and AIX, including the user interface, application programming interface and common communications services.

Saranga said the specific planks of IBM's open systems strategy include the following:

- A native version of AIX for the System/390, which will be a "vanilla" version of the OSF's OSF/1 operating system and will be available in one to two years.
- A port of the database from OS/2 Extended Edition to AIX so that "requestors can find data anywhere in the network," of IBM and non-IBM equipment, Saranga said. IBM will provide a "complete range" of distributed database functions during the next year or two, he added.
- AIX versions of AD/Cycle computer-aided software engineering tools and the ability to define a repository object in one environment and then use that object to create an application in the other environment.

Senior Editor Rosemary Hamilton contributed to this report.

Afloat in indifferent waters

IBM's SAA is like a shark. If it stops moving, it will die. That is according to Earl Wheeler, senior vice president in charge of all SAA initiatives.

He offered the following look at what is ahead in the SAA world:

- **AD/Cycle.** Wheeler said a Repository Manager offering will be available for all three SAA hosts — MVS, VM and OS/400 — by September 1992. Third-party developers are currently working to integrate tools with the existing MVS-based Repository Manager and its Information Model. He said this level of integration should be completed in June 1992.
- **SAA front end.** An improved Common User Access (CUA) will likely be announced this year. "We will probably be kicking up that interface again, probably toward the end of this year, so CUA '91 is on the way," Wheeler said.
- **Officevision.** The troubled strategic office platform will soon get the Wheeler touch. Expect IBM to form strategic partnerships with third-party vendors for future Officevision development. The relationships will be akin to the AD/Cycle inner circle, Wheeler said.

Wheeler said he is committed to delivering the previously stated Officevision functions — and more. No time frame was provided, but Wheeler's intent is to "AD/Cycle-ize" Officevision. "The higher level thought is as we move through time, we will begin to see Officevision take on the blocks of granite as a solution not unlike AD/Cycle and Systemview," Wheeler said.

- **The SQL interface to IMS.** Wheeler promised this one in April 1990 and then recently confirmed that the project has been held up. This one is up for grabs. "If we can have that kind of interface into IMS with acceptable performance, then we will move forward," he said. "Inside, the work continues as we try to make the decision. What I refuse to let happen is an endless debate along the terms of how many angels are on the head of a pin."

ROSEMARY HAMILTON

Unisys mainframe praised but success questioned

BY JOHANNA AMBROSIO
CW STAFF

NEW YORK — Unisys Corp. topped its mainframe line last week with a line of machines that impressed analysts but are unlikely to win Unisys many new customers, they said.

The air-cooled A19 line succeeds the A17 line and consists of six machines with between one and six processors and a peak performance of 51 million instructions per second.

Unisys said the single-processor A19 model runs 1.8 times faster than the current intermediate mainframe, the A16 Model 61E, which processes 272.5 transaction/sec., under an audited Transaction Processing Council's TPC-A benchmark.

Users and analysts gave the machines good marks but said cost-conscious customers will be slow to upgrade.

Jim Cassell, vice president at Gartner Group, Inc. in Stamford, Conn., noted, "It's a very competitive offering, but there are not a lot of Unisys customers that need this kind of capability. Its most immediate effect may be to stem possible defections to IBM because customers now see a migration path."

"It's an awesome machine; particularly impressive is the input/output handling," said Tom Hind, president of the Cube Unisys user group. However, he said, his employer, Spartan Mills in Spartanburg, S.C., will not be buying one anytime soon. "We'll probably do an evaluation this year," he said. "But for now, we're fine."

"It's a competitive product offering for a select portion of the Unisys customer base," said Michael Geran, an independent analyst in New York. He estimated that about 15% of the Unisys A series base would be candidates for the new computers.

Robert H. Dever III, vice president at Liberty Travel, Inc. in Ramsey, N.J., said, "The travel business is, to put it charitably, in a malaise because of the economy and the war. As conditions ease, we'll look at the A19. But the A15L is meeting my needs at this time."

Beating the competition

Unisys trumpeted that its A series of computers now has a performance range of 480 times, compared with 174 for Digital Equipment Corp.'s VAX line and 100 for IBM's Enterprise System/9000, said Frank Brandenberg, vice president at Unisys.

Also, the A19 computers require one-fourth the floor space of an IBM ES/9021 and do not have the overhead involved in water cooling.

The A19 computers are field-upgradable from the A16 processors, introduced in July 1990, and run all A series software. The A19 line will range in price from $5.38 million to $26 million and are slated to ship in the third quarter.

The new computers implement what Unisys called Super Scalar Architecture, based on technology jointly developed with Motorola, Inc. The architecture improves performance by handling instructions based on the resources within the processor instead of the more traditional method based on the order of the instructions submitted.

The A16 "exceeded our expectations," said John Rioux, general manager of the Computer Systems Group, but he would not provide specific numbers. He also said that in 1990, revenue from the entire A series — including maintenance and professional services — grew 5% to 6% during the previous year.

Full extension

Billed as a replacement for the Unisys A17, the firm's new line starts out with 80% better performance than the intermediate Unisys A16

SYSTEM	PROCESSORS	MAXIMUM MEMORY	TRANSACTIONS PER SECOND	PRICE
A19 Model 611	One	1.1G bytes	490.5*	$5.4M
A19 Model 664	Six	2.5G bytes	2,180*	$26M
A19 Model 61E	One	1.8G bytes	272.5	$3.3M

*Estimated

Source: Unisys Corp.

CW Chart: Marie Heinen

Bull offering to combine DOS, Unix with Windows

BY SALLY CUSACK
CW STAFF

BILLERICA, Mass. — Bull HN Information Systems, Inc. will introduce an open systems-oriented, distributed computing model this week at the Cebit Fair in Hannover, Germany, according to several analysts.

The model will reportedly open up Bull's proprietary GCOS architecture via a Unix server environment and a micro-to-mainframe software product designed to unify several operating systems under a common graphical user interface.

"Bull has come out with a very user-centered architecture to open their proprietary operating systems to the Unix environment," said Bob Tasker, vice president of software research at International Data Corp., a market research firm in Framingham, Mass.

Called Affinity, the micro-to-mainframe link component of the model will combine DOS, GCOS, Unix and other operating systems under a common graphical user interface with Microsoft Corp. Windows-like features.

Bull's model will offer components for desktop, communications and transaction processing functions, and all architectures will comply with Open Software Foundation standards, according to industry sources.

In related news, Bull SA in France and its U.S. counterpart, Bull HN, will resell a family of eight high-end mainframes manufactured by NEC Technologies, Inc.

NEC's System 3900 is an upgrade to the 4-year-old System 2000 series. The addressing structure of the new system could lead to a theoretical limit of 700 million instructions per second and a storage capacity of 4 quadrillion bytes of data.

The system uses NEC's ACOS operating system and can be configured with as many as eight processors. It is scheduled for release by year's end 1992. Monthly rental fees will start at $484,615, NEC said.

IBM

FROM PAGE 1

Management, Inc. subsidiary's director of information systems.

However, even the lure of APPN is unlikely to convince most users to migrate existing Netbios and Novell, Inc. applications to LU6.2, Ernst & Young partner David Passmore said.

For example, the city of New York is eyeing APPN's dynamic network topology, congestion control and routing capabilities as a way of better controlling a diverse LAN installation, noted Joseph Giannotti, commissioner of the city's computer services. However, implementing LU6.2 as a user protocol "is not a high priority," he added.

Taking an "if you can't beat 'em, join 'em" attitude, IBM announced last week that it will publish specifications that would enable other vendors' systems to participate in an APPN network as end nodes. End nodes can dynamically register their resources on the nearest APPN network node but cannot support dynamic directory and routing services provided by such network nodes.

Novell, Apple and Siemens AG said last week they are already implementing APPN on their systems. Systems Strategies, Inc. announced plans to implement APPN on a variety of Unix systems, including IBM's RISC System/6000. The firm plans to ship APPN software for Digital Equipment Corp. VAX/VMS systems by the first quarter of next year.

SNA compatibility

Apple users equipped with APPN should be able to automatically call up an SNA resource via the Macintosh "chooser" function, Apple product manager Bill Brown said. Users should also be able to use an SNA backbone as a "funnel between two Appletalk networks." Apple will support APPN in its SNA-based software by the third quarter of 1991.

Novell said it expects to fit into SNA as a "gearbox" that extends APPN capabilities to Netware clients such as Macintosh workstations and Ethernet and Arcnet LANs.

The opening of APPN is good news to companies that want to keep their non-IBM LAN systems but also want optimal access to SNA resources. Chemical Waste, for example, would like its Novell Netware 386 applications to "participate in a cooperative fashion" with its AS/400s, Hansen said.

IBM has yet to announce an APPN product for the IBM VTAM Network Control Program systems.

IBM's APPN implementation on OS/2 Extended Edition, called Networking Services/2, includes the following features:

- The ability to send LAN alerts to a Netview host directly or via an AS/400 Netview focal point.
- The ability to configure an OS/2 LAN workstation with only three parameters.
- Common Programming Interface for Communications, a simplified application programming interface for LU6.2.

IBM also announced Netview Distribution Manager/2 for OS/2, which is said to allow users to download centrally archived software to DOS and OS/2 LAN clients via an OS/2 server.

What APPN brings to the table

While it has been technically possible to set up a peer-to-peer network over SNA, users are emphatic that it has not been worth the trouble without APPN. Here are some of the reasons:

Without APPN:

1. Keeping track of the location of network applications, users and other resources requires repeated manual updates to SNA directories
2. In many cases, network must be taken down while a change is implemented
3. Users and applications must specify the exact address of a network resource in order to access it
4. Routing tables, to determine the best path between two network nodes, must be calculated and manually updated

With APPN:

1. Network nodes maintain their own tables and automatically notify each other of changes to their attached end nodes' resources
2. Changes can be made without disruption to network operations
3. The system eliminates much of the effort of addressing queries
4. APPN dynamically calculates routes and works to control network congestion

CW Chart: Paul Mock

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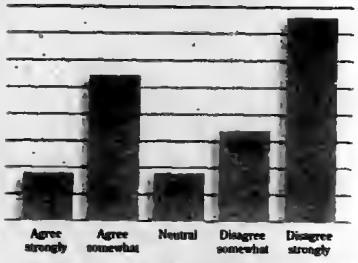
TRENDS

OUTSOURCING

The outsourcing trend continues to solidify. The overall percentage of companies considering outsourcing went from 23% one year ago to 32% today

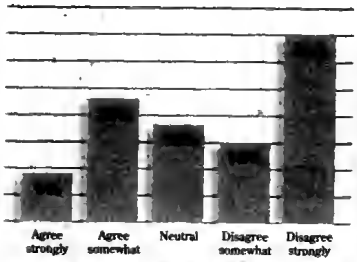
"Our organization is currently outsourcing some IS activities"
Percent of respondents (base: 394)

More than one-third of the companies surveyed have turned over some portion of IS responsibility to outside vendors



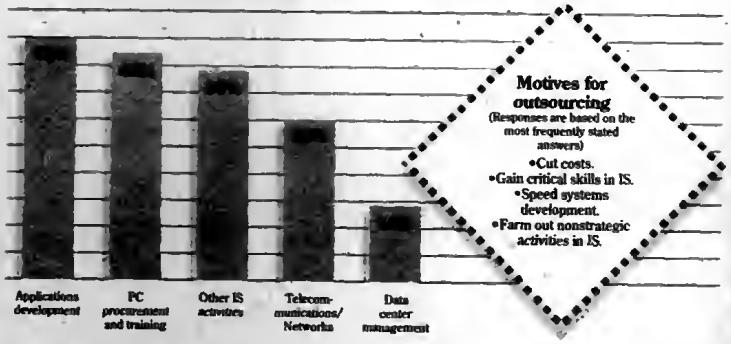
"Our organization is currently considering outsourcing in the next year"
Percent of respondents (base: 394)

Opposition to outsourcing is not as strong as last year, dropping from 66% to 50% this year



Preferred functions to outsource
Percent of respondents (base: 142)

At companies that are outsourcing, a variety of IS tasks are left for third-party vendors, with 45% turning over control of applications development and most personal computer matters



Motives for outsourcing
(Responses are based on the most frequently stated answers)
- Cut costs.
- Gain critical skills in IS.
- Speed systems development.
- Farm out nonstrategic activities in IS.

Source: Index Group, Inc., Cambridge, Mass.

CW Chart: Tom Monahan

NEXT WEEK

Raymond Kurzweil ▶ wrote his first software program at age 12, and he hasn't slowed down since. In recent years, this computer scientist has done breakthrough work in the areas of speech and pattern recognition. In a recent interview with *Computerworld*, Kurzweil talked about intelligent technology and its impact on people's lives.

Sluggish economic times haven't stopped many organizations from exploring ways to exploit emerging technologies such as multimedia and expert systems. Analysts say advanced technology groups are enjoying great popularity, despite the recession. Executive Report looks at how some organizations are turning new ideas into real, usable systems.

INSIDE LINES

Mail-order misery

Financially strapped Northgate Computer Systems has apparently been unable to convince bankers to lend it money, despite the efforts of Gary Heid, who was named president in December. Northgate is now negotiating with an investment firm that specializes in lending money to high-risk companies, according to a source close to the negotiations.

Patriot missive

On March 19, Patriot Partners, the joint development partnership owned by IBM and Metaphor, will host a reception for software vendors to launch the "Constellation Project" and "present the Patriot vision." Patriot is working on application systems software that will operate under OS/2, AIX and other Unix versions as well as non-IBM 32-bit operating systems. Application programming interfaces are slated to be shipped this fall, followed by a developers' tool kit in 1992.

Sun still shines in Arizona

Despite some reports to the contrary, the Operation Sundevil hacker case is not "mired," as reported in *Computerworld* [CW, Feb. 11], but rather is struggling under the weight of its own success, according to Gail Thackeray, the former Arizona assistant attorney general. "If anything, we are bogged down in evidence." Thackeray said that one or more indictments will be issued later this month in Arizona.

E is for Error

Novell is telling its users to abandon its Revision E shells for Netware 3.1. Network administrators have been told to go back to Revision D. The networking company updates the trouble-prone shells, which act as links between Netware's Internet Packet Exchange protocol and DOS, about every three months. With a little luck, Revision S — as in Safe — will be here before long.

Callers turn deaf ear to Compaq

Compaq opened up its toll-free lines last week and, for the first time, offered free direct technical support. However, the company was not overwhelmed with calls. The volume was "less than we anticipated," said Compaq North America Vice President Ross Cooley. No one counted, but there may have been more operators on duty than callers. "Let's just say we were very well staffed," Cooley said.

DOS: What is it good for?

Sun Microsystems co-founder and chief wizard William Joy said last week that DOS-based personal computers are only good for four applications: "word processing, spreadsheets, word processing and spreadsheets." Joy added, "These things aren't very interesting to me." Speaking to an appreciative group of Sun users at the National Air and Space Museum in Washington, D.C., the acerbic Joy also said Intel microprocessors are the worst possible engines for desktop systems.

Peer-to-peer squabbling

IBM is reportedly in the midst of yet another internal feud, this time on the issue of whether to allow users to wrap their 3270 transmissions inside the LU6.2 peer-to-peer Systems Network Architecture protocol. Doing this could finally break down users' resistance to migrating to LU6.2 because it would eliminate the need to rewrite all of their 3270 host applications. However, an internal political logjam makes it unlikely that we will see such a product, our source told us.

Fuzzy logic technology is another U.S. development finding success elsewhere. The Japanese have already embedded fuzzy logic microprocessors in washing machines, air conditioners and other everyday devices. However, there are signs that the U.S. is not walking away from the technology. The IEEE Neural Networks Council, for example, is sponsoring the First International Conference on Fuzzy Systems in March 1992. No matter what your logic, News Editor Pete Bartolik wants to hear from you. Catch him by telephone at (800) 343-6474, by facsimile at (508) 875-8931, or send electronic mail to: COMPUTERWORLD on MCI Mail; MHTS78A on Prodigy or 76537,2413 on Compuserve.

AT&T introduces the biggest thing to hit contact lens sales since shag carpeting.

AT&T Integrated Services Digital Network (ISDN) gave Bausch & Lomb the capability to take 1,000 more orders per week.

Ask most people what AT&T ISDN has to do with the contact lens business and they'll probably tell you it's the first line on the eye chart. But if you ask the people at Bausch & Lomb, they'll tell you about a digital technology so innovative, it lets them answer a lot more calls using the same number of live operators they had before.

Not too long ago, Bausch & Lomb's customer service center was getting a lot more calls than they could handle. Realizing that lost calls can turn into lost customers, they called AT&T for help.

Through AT&T ISDN, Bausch & Lomb got a feature called Automatic Number Identification (ANI). With ANI, their computers can automatically capture each caller's phone number and match it to the customer's record. The end result? Call handling time has been cut by an average of four seconds per call. Which means Bausch & Lomb's customer service representatives can now handle about 1,000 more weekly calls than they could before.

So if you've been looking for a way to boost sales without taking on more overhead, call off the search. AT&T's contact lens solution could be the answer for your business, too.

Innovation. Another AT&T advantage.

For more information about AT&T ISDN, call your AT&T Account Executive or 1 800 247-1212, Ext. 144.

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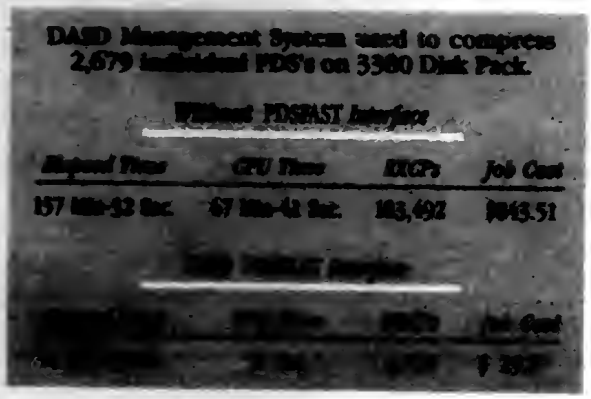

• CICS/DATABASE Libraries — PDSFAST copies and compresses CICS and Database libraries in a fraction of the time presently used. Typical elapsed time for a copy or compress of screen libraries, and other similar datasets goes from about 40 minutes to under 1 minute. PDSFAST eliminates unnecessary system down-time spent waiting for copy and compress operations to complete.

• IEBCOPY/SPFCOPY — PDSFAST will replace all batch and interactive IEBCOPY and SPFCOPY/COMPRESS functions. PDSFAST will save over 80% of the time and resources presently used.

• SMP Processing — SMP and SMP/E both dynamically invoke IEBCOPY thousands of times during a typical run. PDSFAST reduces SMP and SMP/E run time and resource consumption by over 75%.

PDSFAST is now used at over 7,500 MVS installations worldwide. PDSFAST provides a competitive advantage for MVS installations of all sizes, saving many thousands of dollars in data center resources daily. PDSFAST is also saving thousands of individuals many hours of unnecessary time spent waiting for work to be completed.

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